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Forest Service

Pacific
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Region

1986

Appendices – Draft Environmental Impact Statement

ORIGINAL

Proposed Land and Resource Management Plan

Wallowa–Whitman National Forest

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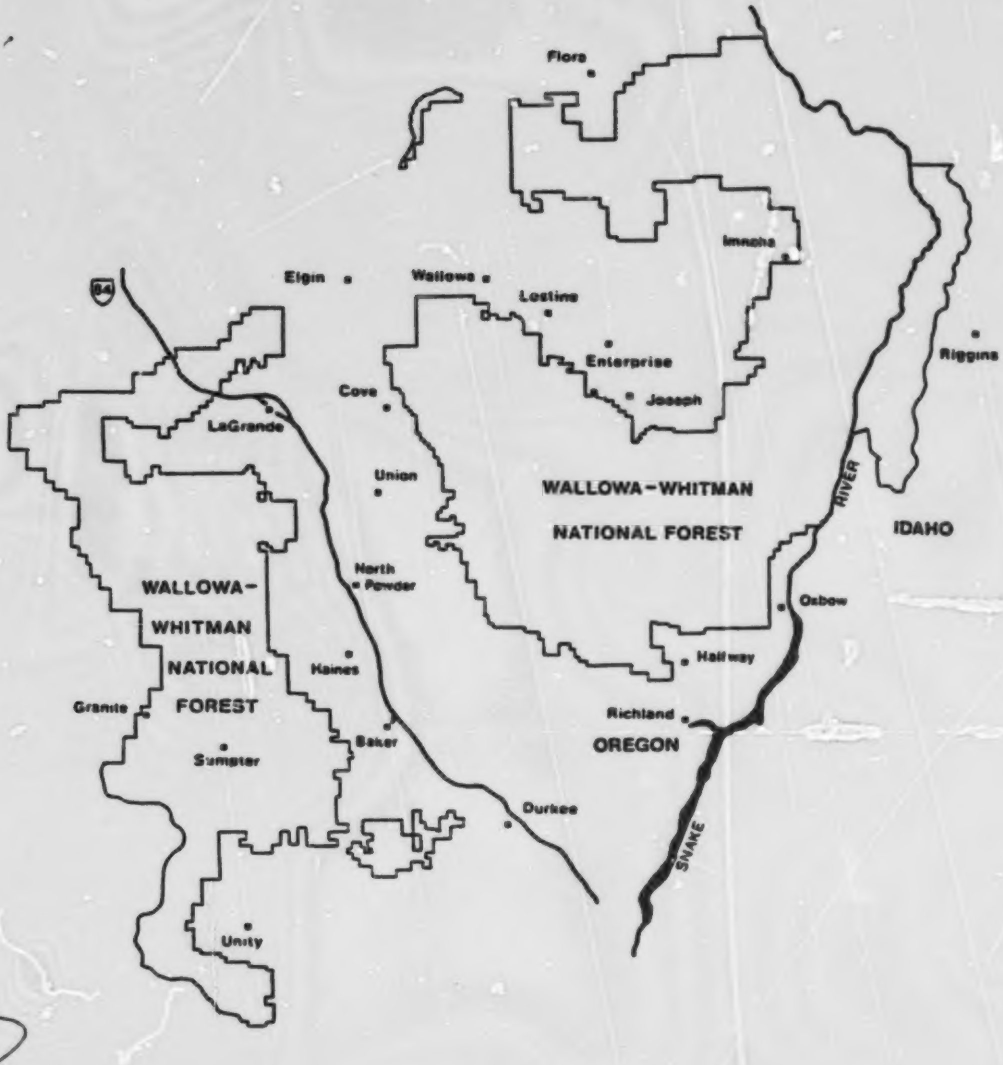
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Nature and Purpose of Appendices

The appendix materials are intended to supplement the environmental impact statement by providing process, procedural, or substantive detail for those readers who are interested in the more technical aspects. Because of its technical nature, some of the appendix materials, especially parts of Appendix B, will not be easily understood by all readers.

Appendix A

IDENTIFICATION OF ISSUES, CONCERNS AND OPPORTUNITIES

I. Issues, Concerns and Opportunities Identification Process

During the period of 1972 through 1981 the Forest was involved in preparation of three unit plans (Wallowa Valley, Grande Ronde and Burnt Powder) and the Hells Canyon National Recreation Area Plan. Each of these plans was developed in accordance with the National Environmental Policy Act of 1969. Therefore, identification of issues, concerns and opportunities (ICO's) were the basis for alternative development and comparison for each. Not surprisingly, many of the ICO's were similar in each of the plans. These included effects on local economy, timber production levels, livestock grazing levels, acres of old-growth habitat and others. In addition, management concerns were similar in each planning unit as were the recognized opportunities for resolving concerns or improving conditions.

It is with this background that the identification of ICO's for the Forest Plan was initiated. Forest managers and planners were reasonably certain that the issues identified over the previous decade were still valid.

On July 30, 1979 the 1,400 people on the mailing list at that time were contacted. A suggested list of issues was provided. In response to this mailer, 180 people verified, suggested changes or deletions, or gave suggestions for new issues to be considered. The results of this initial effort are documented in a report termed "Development of the Preliminary Decision Criteria, Wallowa-Whitman National Forest."

On November 16, 1979 a meeting was held with the Forest Planning Citizens Panel. The panel includes 13 representatives of local agencies and interest groups. A purpose of the meeting was to refine and firm up the ICO's.

On March 26, 1980 we again contacted the mailing list (which had been trimmed to 1,100) with a tentative list of decision criteria based on the issues. On January 9, 1981 we provided feedback to the mailing list members on the final decision criteria. (see "Development of the Preliminary Decision Criteria", Wallowa-Whitman National Forest, on file at the Forest Supervisor's Office in Baker, Oregon). From that time until July, 1983, 30 formal meetings and numerous informal meetings were held with service clubs, interest groups, industry representatives and others where the issues were discussed.

On July 29, 1983 those on the mailing list were again contacted, as was the citizens panel. The purpose was to reconsider the ICO's, due to the time that had elapsed, and to consider the wilderness issue. Feedback was provided on March 8, 1984. The issues redefined or confirmed at that time are those that are carried forward in this analysis and DEIS. An exception is the wilderness issue which was eliminated as a major issue with the passage of the Oregon Wilderness Act of 1984.

During the five years of developing the Forest Plan, the issues have remained fairly constant but have taken several forms. Originally they were stated as brief paragraphs with a list of the facets (concerns and opportunities) and a notation of related issues. Later they were, in response to National direction, reformatted as decision criteria.

Then, due to concern that we were straying from NEPA direction, we were directed to return to issue statements. In order to be able to quantitatively or qualitatively address the issues, each began with a problem statement to be resolved. Recently, after reviewing several draft environmental statements, the Chief of the Forest Service has encouraged use of the narrative format as we have presented them in Chapter I of the Draft Environmental Impact Statement.

II. Consultation With Others

The National Environmental Policy Act of 1969 and the National Forest Management Act (1976) require that the National Forest land management planning be an open process that encourages public participation. Examples from the NFMA rules and regulations are:

> 36 CFR 219.6(a) Because the land and resource management planning process determines how the lands of the National Forest System are to be managed, the public is encouraged to participate throughout the planning process.
>
> 36 CFR 216.6(d) Public participation activities should be appropriate to the area and people involved. Means of notification should be appropriate to the level of planning. Public participation activities may include, but are not limited to, requests for written comments, meetings, conferences, seminars, workshops, tours, and similar events designed to foster public review and comment.
>
> 36 CFR 219.7(a) The responsible line officer shall coordinate Regional and Forest planning with the equivalent and related planning efforts of other Federal agencies, State and local governments, and Indian tribes.

The Wallowa-Whitman lies in rural northeast Oregon. Communications within the area are perhaps less formal than in metropolitan areas. In order to keep the local public informed, the Forest has relied on day-

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to-day informal contacts as much as on formal contacts. An atmosphere exists whereby any interested persons can, at their convenience, visit or call the Forest Supervisor or planning team members and discuss concerns about any aspect of the planning process. The Forest recognized, however, that this approach would not reach the more distant Forest users, nor would it involve all of the local public. To fulfill these needs, the following methods were used:

1. A notice of intent to prepare the Forest Plan and environmental documents was published in the Federal Register.

2. A citizens' panel was established which included members of various local government agencies and representatives of prominent local special interest groups. The panel met on an as needed basis and was a useful means of involving local officials as well as others. The panel provided an ongoing "sounding board" for the planning team, provided useful information, and enabled the panel members to hear each others' views. The panel included 13 non-Forest Service members as follows: a livestock rancher, a county cooperative extension agent, members of the Umatilla Tribal Council, State Land Conservation and Development Commission, Izaak Walton League, representative of the Blue Mountain Resources Council, Oregon State Dept. of Forestry, Oregon State Employment Division, Northwest Pine Association, Oregon Dept. of Economic Development, Wallowa Resource Council, Oregon Dept. of Fish and Wildlife, and a county judge.

3. A mailing list containing the names of all persons who asked to be involved was maintained by the Forest. The list includes some 1,100 names. Persons on the mailing list were contacted at key points in the planning process and invited to provide information or opinion. The mailing list was also used to update interested people on the status of planning six times during the development of the Forest Plan.

4. News releases were used to help keep the local and regional publics informed. Because of the local interest in land management planning-related issues, news reporters from Portland, La Grande, Baker, Lewiston, Enterprise, and Ontario newspapers often reported or prepared feature articles on various aspects of the planning effort.

5. The Forest responded to all requests for speakers at service clubs, civic groups, or other organizations.

The Forest plans to continue involving the public in a similar means during the remainder of the planning effort. Public meetings have been scheduled throughout the Forest zone of influence in order to help people provide meaningful comments on the alternatives. Thereafter, public comments will be summarized for use in arriving at a final decision on a selected Forest management alternative.

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Following in order of occurrence, are formal contacts made to date.

Date	Type of Contact	Who Contacted	Subject	Approximate Number of Non-Forest Service People Involved
6/22/79	Meeting	Forest Panel	Planning Update & Feedback	8
7/30/79	Mailer	Mailing List	Issues & Concerns	1100
8/11/79	Meeting	Oregon Department of Fish and Wildlife	Wildlife Concerns	4
11/16/79	Meeting	Forest Panel	Planning Update & Feedback	9
3/26/80	Mailer	Mailing List	Planning Update & Feedback	1100
7/16/80	Mailer	Mailing List	Decision Criteria	1100
8/7/80	Meeting	Forest Panel	Planning Update & Feedback	8
1/8/81	Meeting	Ellingson Timber Co.	Information Gathering	1
1/9/81	Mailer	Mailing List	Summary of Decision Criteria	1100
1/13/81	Meeting	Blue Mtn Resources Council	Socioeconoomic Concerns	7
2/5/81	Meeting	Northwest Pine Association	Timber Concerns	6
5/18/81	Tour	Timber Industry	Land Suitability	5

Date	Type of Contact	Who Contacted	Subject	Approximate Number of Non-Forest Service People Involved
7/1/81	Mailer	Adjacent Private Landowners	Encourage Participation	1460
1/13/82	Meeting	Timber Industry	Planning Concerns	7
2/19/82	Meeting	Forest Panel	Planning Update & Feedback	10
3/25/82	Meeting	Wallowa Resources Council	Planning Concerns	5
4/21/82	Meeting	Union County Planner	Coordination	1
4/27/82	Meeting	Wallowa Resources Council	Planning Concerns	4
4/27/82	Meeting	Livestock Permittees	Grazing Concerns	24
4/27/82	Meeting	Wallowa County Planner	Coordination	1
4/27/82	Meeting	Wallowa County Planner	Coordination	3
6/2/82	Meeting	Oregon Department of Fish and Wildlife	Coordination	2
6/3/82	Meeting	Wallowa Resources Council	Planning Concerns	3
7/8/82	Meeting	Timber Industry	Planning Concerns	12
8/10/82	Meeting	Oregon Department of Fish and Wildlife	Coordination	5

Date	Type of Contact	Who Contacted	Subject	Approximate Number of Non-Forest Service People Involved
8/19/82	Meeting	BLM	Coordination	2
8/21/82	Meeting	Umatilla Tribe	Encourage Participation	1
10/28/82	Meeting	Forest Panel	Update & Feedback	8
11/3/82	Meeting	County Officials	Baker City Watershed	2
1/6/83	Meeting	La Grande Chamber of Commerce	Planning Concerns	40
1/12/83	Meeting	Wallowa County Court	Encourage Participation	2
1/13/83	Meeting	Blue Mtn Resources Council	Planning Concerns	21
1/24/83	Meeting	Baker County Court	Coordination	3
1/25/83	Meeting	Boise Cascade Corporation	Planning Concerns	2
2/7/83	Meeting	Elgin Chamber of Commerce	Planning Concerns	30
2/8/83	Meeting	Timber Industry	Planning Concerns	5
2/10/83	Meeting	Wallowa County Chamber of Commerce	Planning Concerns	12
2/10/83	Meeting	Grande Ronde Resources Council	Planning Concerns	10
2/10/83	Meeting	Western Forests Industries Association	Planning Concerns	5

Date	Type of Contact	Who Contacted	Subject	Approximate Number of Non-Forest Service People Involved
1/9/83	Meeting	Grande Ronde Resource Council	Planning Concerns	20
7/29/83	Mailing	Mailing List	Issues & Concerns	1100
11/4/83	Tour	Boise Cascade	Timber Concerns	1
11/29/83	Meeting	Forest Panel	Planning Update & Feedback	3
1/12/84	Meeting	Grande Ronde Resource Council & Izaak Walton League	Timber Sales & Planning	4
1/26/84	Meeting	Nez Perce Tribe	Planning Concerns	6
2/10/84	Meeting	Forest Panel	Planning Update & RPA	10
2/27/84	Meeting	National Wildlife Federation & Others	Planning Concerns	7
3/8/84	Mailer	Mailing List	Planning Update	1100
3/8/84	Meeting	Baker County Court	Planning & RPA	7
4/10/84	Meeting	Izaak Walton League	Planning Concerns	25
6/21/84	Meeting	Forest Panel	Planning Update	10
10/19/84	Meeting	Wallowa County Court	Planning Concerns	6
11/6/84	Meeting	Oregon Department of Fish and Wildlife	Planning Update, Concerns	2

Date	Type of Contact	Who Contacted	Subject	Approximate Number of Non-Forest Service People Involved
11/14/84	Meeting	NW Pine Assoc.	Planning Update	2
11/15/84	Meeting	Boise Cascade Corp.	Planning Update	2
12/16/84	Meeting	NW Pine Assoc. & Boise Cascade Assoc.	Timber Cost Data	2
2/26/85	Meeting	NW Pine Assoc. and Boise Cascade Corporation	Timber Inventory Timber Land Suitability	5
3/25/85	Meeting	Oregon Natural Resources Council	Citizens Alternative	1
3/27/85	Meeting	Powder River Sportsman Club	Citizens Alternative	1
3/27/85	Meeting	Wallowa-Whitman Timber Purchasers	Planning Update	30
3/28/85	Meeting	Oregon State Dept. of Forestry	Planning Update	1
4/5/85	Meeting	Powder River Sportsman Club	Citizens Alternative	1
4/10/85	Meeting	Powder River Sportsman Club	Citizens Alternative	1
4/12/85	Meeting	Powder River Sportsman Club	Citizens Alternative	1
4/15/85	Meeting	Powder River Sportsman Club	Citizens Alternative	1
5/7/85	Meeting	Umatilla Confederated Tribe	Planning Coordination	8
5/16/85	Meeting	Forest Panel	Planning Update	9
7/10/85	Meeting	Oregon Department of Fish and Wildlife	Planning Update and Old-Growth	2

Date	Type of Contact	Who Contacted	Subject	Approximate Number of Non-Forest Service People Involved
11/7/85	Meeting	Baker County Chamber of Commerce Task Force	Planning Update	10
11/29/85	Meeting	Oregon Department of Forestry	Planning Update	1

III. Selected Issues, Concerns and Opportunities

As described in Part I of this Appendix, the Forest had recently completed unit planning at the time development of the Forest Land and Resource Management Plan was initiated. Unit planning involved many of the same public groups, and the same lands, that were to be involved in developing the Forest Plan. Therefore, the planning team had a reasonable idea of the prominent issues and did not have to begin from zero in the scoping* process.

All public comments gathered during the three times the public was contacted in regard to the ICO's were carefully sorted and tabulated. Additional suggested issues or concerns were screened by the following criteria:

1) Is it appropriately addressed in a Forest Plan? (Many suggestions dealt with day-to-day administrative matters or projects which were already approved and being implemented in accordance with the National Environmental Policy Act of 1969.)

2) Is it part of a larger issue already described? (Many suggestions were made which were incorporated into the major issues originally described.)

3) What is the level of public or administrative concern over a suggested issue? The number and intensity of responses on a suggested issue were used to gauge the level of concern over a potential issue (not how the issue should be resolved, just the level of concern). Those issues of apparently lesser concern were often incorporated as facets of major issues.

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*See Glossary

Issues and concerns that were not likely to vary significantly between alternatives were placed in another category to be addressed the same in all alternatives, such as through standards and guidelines, or were dismissed as in the cases where respondents offered suggestions that had to do with day-to-day administrative matters or were otherwise beyond the scope of the planning process.

Several issues evolved significantly during this public involvement process:

Timber as an issue became much more specific. It originated as a concern over total timber quantities offered and grew to encompass concerns as to the mix of size classes and tree species offered as well as the total volume. The problem of below cost timber sales was the latest facet to become a part of this issue.

Roadless areas came full circle from emphasis on management of unroaded areas, including maintaining options for the future, through emphasis on which areas should be allocated to wilderness, and returning to an emphasis on how these unroaded areas should be managed now that the Oregon Wilderness Bill has become law.

Water quality was deleted as an issue in itself because minimum management requirements under the National Forest Management Act provide sufficient protection of water quality to address the major element of this issue (the effects of the timber harvest activities on water quality). Other elements of this issue were also addressed under Transportation, Timber and Livestock so the planning team felt it unnecessary to retain water quality as an issue which would vary with alternatives.

Although not identified as issues in the scoping process, present net value, first-decade cash receipts, budget costs, and noncash benefits*, are by Forest Service direction, to be used to compare alternatives. Therefore, they are treated as though they were issues. Also included are the benefit/cost ratios for each alternative.

Since the required alternatives define the range of alternatives from commodity emphasis to amenity emphasis, the planning team task became one of "filling in the gaps" in order to ensure a range of reasonable alternatives from which a preferred alternative could be selected. Rather than emphasizing certain issues with minimal consideration for others, Alternative D, C, C-departure, G and H were developed with more issue compromise in mind than is true with the other alternatives.

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*Noncash benefits occur when the National Forest provides goods or services at less than the amount users are willing to pay. The difference between the willingness to pay and the amount actually charged is the noncash benefit, i.e. the potential Federal income that is transferred to the user.

The primary issues to be addressed and which are treated differently in the design of alternatives are as follows:

- -Transportation System Management
- -Timber Production
- -Management of Undeveloped Areas
- -Local Economy
- -Recreation Diversity
- -Livestock Production
- -Old-Growth Timber
- -Minerals
- -Wildlife Habitat--Deer and Elk

These issues are described in Chapter I of the DEIS.

Of the nine major issues, nearly all are competitive to some degree. Those conflicts that are significant enough to require tradoff analysis are:

- -Timber production vs old-growth ecosystems
- -Timber production vs landscape appearance
- -Timber production vs wildlife habitat
- -Timber production vs undeveloped areas
- -Transportation system vs undeveloped areas
- -Transportation system vs wildlife habitat
- -Local economy vs undeveloped areas
- -Local economy vs old-growth habitat

Some issues were found to be competitive only above certain levels of production. For example, timber production and big-game habitat are complementary in Alternative F. When higher outputs of timber were sought in the remaining alternatives, these issues became competitive.

Certain issues had to do with administrative matters or did not lend themselves to being resolved through the land management planning process. These were deferred for resolution outside the process and are as follows:

-Seasonal Road Closures for Recreational or Wildlife Purposes (to be addressed through the annual Forest Travel Plan).

-Botanical Area Needs (deferred to the next Forest Plan).

-Collocation of Forest Service administrative facilities in Wallowa County (to be determined through separate study).

-Specific management of the Oregon Trail (separate project plan).

-Concern about lack of funding to implement the Hells Canyon National Recreation Area Comprehensive Management Plan on schedule.

-Wild and Scenic River Recommendations within wilderness and the

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Hells Canyon National Recreation Area (deferred for later consideration).

-Reconsideration of the Decision on whether to provide a trail on the east side of the Snake River immediately below the Hells Canyon Dam for fishing access (to be determined through supplemental analysis to the Hells Canyon National Recreation Area Environmental Impact Statement).

-Various organizational and size of work force matters.

Other issues were identified that had minimum standards established by law. Therefore, although the outputs and effects may vary among alternatives, they were addressed by standards and guidelines and treated the same in all alternatives. They are as follows:

-Treatment of Threatened and Endangered Species
-Maintenance of Water Quality
-Protection of Riparian Habitat
-Maintenance of Air Quality
-Protection of Wetlands and Floodplains
-Protection of Prime Forest, Range and Farmlands
-Consideration of Civil Rights
-Indian Treaties

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Appendix B

Description of the Analysis Process

I. INTRODUCTION

A. Planning Problem

The Forest Service is responsible for determining how best to manage National Forest lands based on public desires, needs, and land capabilities.

Public interest includes divergent viewpoints about the use of market commodities such as timber, grazing and energy and non-market commodities such as wilderness, unroaded recreation, scenery, wildlife, old-growth, and habitat diversity. The Forest's major planning goal is to provide enough information to help decision-makers determine which combination of goods, services, and land uses will maximize net public benefit. (This concept is further discussed in Section IV of this Appendix.) The National Forest Management Act (NFMA) and the regulations developed under NFMA (36 CFR 219) provide the analytical framework to address this objective; they also state that the requirements of the National Environmental Policy Act of 1969 (NEPA) and its regulations (40 CFR 1500-1508) must be applied in this analysis process.

B. Planning Process

The planning and environmental analysis process brings a new outlook and a new technology to National Forest land management, principally: (1) processes formerly used to make individual resource decisions are now combined to help make integrated resource management decisions; and (2) new mathematical modeling techniques are used to assist in the proposed land use problem, including identifying the most cost-efficient pattern of land management. The 10-step planning process is discussed in the NFMA regulations and in Chapter I of the DEIS. Appendix B describes the analysis phase of this process covering steps 3, 4, 5, and 6. The judgment phase, steps 1, 2, 7, and 8, is described in Chapters I, II, and in Appendix A of the DEIS. The execution phase, steps 9 and 10, is presented in the Proposed Land and Resource Management Plan (Forest Plan).

The analytical elements discussed in Appendix B are as follows:

1. **Inventory Data and Collect Information (Planning Step 3)**

   The Interdisciplinary Team (representing the professions of forestry, hydrology, engineering, wildlife biology, sociology, and economics) determined what data were necessary based on the issues and concerns. Analysis of the management situation (AMS), formulation of alternatives, and monitoring require data on resource capabilities, existing supply and demand, expected outputs, benefits, and costs. Existing data were used whenever possible but were supplemented with new data to help resolve sensitive issues or management concerns. Data are on file in the Forest Supervisor's Office in Baker, Oregon.

2. **Analysis of the Management Situation (Planning Step 4)**

   This analysis examines resource supply and market conditions and determines suitability and feasibility for resolving issues. A land allocation and activity scheduling model (FORPLAN) was used to address a number of specific requirements, including benchmarks. Requirements include: (1) the projection of the Forest's current management program; (2) determining the Forest's ability to produce a range of goods and services from minimum management to maximum production; (3) evaluating the feasibility of reaching the National production goals (RPA targets) and of meeting social demands identified as issues and concerns; and (4) identifying monetary benchmarks which estimate the output mix which maximizes present net value of resources having an established market or assigned value. The summary of this analysis of the management situation is Chapter 2 of the Forest Plan.

3. **Formulation of Alternatives (Planning Step 5)**

   The information gathered during the first four planning steps is combined and analyzed to formulate alternative management plans. The alternatives reflect a range of resource management direction. Each major public issue and management concern was addressed in one or more alternatives. Management prescriptions and practices were formulated to represent the most cost-efficient way of attaining the objectives for each alternative. Both priced and nonpriced outputs are considered in formulating the alternatives.

4. **Estimation of Effects of Alternatives (Planning Step 6)**

   The physical, biological, economic, and social effects of each alternative were estimated and analyzed to determine how each responds to the range of goals and objectives assigned by the RPA Program. FORPLAN was used to estimate some of the economic and physical output effects, while other methods were used for the remaining effects. The analysis included: (a) direct effects; (b) indirect effects; (c) conflict with other Federal, State, local, and Indian tribe land use plans; (d) other environmental effects; (e) energy requirements and conservation potential; (f) natural or depletable resource requirements and conservation potential; (g) historic and cultural resources; and (h) means of mitigation.

II. INVENTORY DATA AND INFORMATION COLLECTION

A. Forest Data Base

Inventory data were collected for many resources so that issues could be addressed, limitations defined, and capability determined. Some of the data were necessary to develop the Forest Planning Model and to determine capability and analysis areas.

1. **Capability Areas**

Capability areas were delineated by the overlay of land type, logging systems, working group, and forest regeneration difficulty information. The composite maps, at 1 inch/mile are on file at the Forest Headquarters in Baker, Oregon.

Land types divide the Wallowa-Whitman Forest into generalized slope classes (less than or equal to 35 percent and greater than 35 percent) and potential cover forage relationships (dominantly timbered, mixed timbered-grass, and dominantly grass). Logging systems further split the steep lands into those that can be logged utilizing short-span skyline technology, and those that must be logged with long-span skyline or helicopter logging systems.

Working groups represent generalized community type associations (the CD-CP, CW-CE, and lodgepole pine dominated)*. They also identify nonforest and nonvegetated areas. The timber working groups are indicative of productive potential for the Forest.

Regeneration difficulty information was used to delineate inclusions of forest land within these land type/working group combinations which cannot be regenerated within five years, or which require additional investments to establish regeneration on high elevation lands or reduce the competition of ninebark shrubfield. The various resource maps were somewhat generalized in order to delineate more contiguous capability areas. Slivers or obvious inclusions were not considered in mapping. Capability areas are more fully described in Section III of this appendix.

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*The CD-CP working group represents stands dominated by ponderosa pine or Douglas-fir. The CW-CE stands are dominated by true firs (white fir, grand fir, and subalpine fir) or Engelmann spruce.

2. Production Coefficients

The ID Team developed coefficients for timber, range, wildlife, recreation, water, and costs. Many of the coefficients other than timber were calculated outside the model and using information from some of the reports from the model.

3. Suitable Lands

The suitable land classification breaks the National Forest land on the Wallowa-Whitman into the following categories: water, existing roads, and other nonforested lands; forested lands which are capable but not available for timber harvest; forested lands available and capable; forested lands technologically not suited; and available, capable, and tentatively suitable forest lands. These classifications were incorporated into the analyses area identifiers in FORPLAN. The suitable lands determination is more fully discussed in Appendix E and in Chapter III of the DEIS.

4. Developing Allocation and Scheduling Alternatives

The condition classes of existing vegetation were used to schedule management activities over time for the various benchmarks and alternatives.

5. Monitoring

At intervals established in the Forest Plan, management practices will be evaluated to determine how well objectives have been met, how accurate effects and cost projections are, and how closely management standards and guidelines have been applied. The results of monitoring and evaluation will be used to analyze the management situation during review and revision of the Forest Plan in future years.

The Forest Planning data base will provide a means by which changes in resource production rates and differences in inventory data can be measured and will also be used to monitor implementation activities.

6. Plan Implementation Programs

The data base provides biological and physical data that will help develop subsequent programs for Plan implementation. As more information becomes available, the data base will be updated and improved.

B. Sources of Data

1. Slopes, logging systems, and distribution of cover and forage areas are mapped into land types at 1" to the mile.

2. Regeneration difficulty and unstable soils are classified and mapped at 1" to the mile.

3. Working groups (generalized potential vegetation types) are mapped at 1" to the mile.

4. The streams and rivers were inventoried by stream class. These describe the condition of the stream or river and classify it according to its relative importance to domestic use or fisheries. Stream classes are mapped at 1" to the mile.

5. In 1978-1979 all of the tree stands which met the definition of forested land were mapped and described. This resulted in over 50,000 stands being delineated. The mapping and descriptions are continuously updated. A data base "frozen" in 1980 provided much of the information used to identify analysis areas. Updates to 1984 for recent timber harvest or sale activity were derived from the current data base.

6. Elk and mule deer winter ranges were mapped with participation and concurrence of the Oregon Department of Fish and Wildlife. Hiding and thermal cover were correlated with timber stand inventory in No. 5 above.

7. Existing timber volumes and growth were based on the 1979 timber inventory. Appendix L describes the reconciliation of 1968, 1979, and FORPLAN inventory data.

8. The Forest's recreation potential was identified through the Recreation Opportunity Spectrum. Existing conditions were mapped at 1" to the mile and future conditions estimated.

9. The visual resources of the Wallowa-Whitman were mapped at 1" to the mile.

10. Information from range analysis and Allotment Management Plans was used to determine potential forage allocations and identify problems in need of correction.

11. Wetlands, floodplains and riparian areas were inventoried and mapped.

12. Habitat for the existing bald eagle nesting territory was mapped and habitat conditions described in general.

13. Land status information was used and continually updated as conditions changed. It included all categories of land status: private, County, State, National Forest, and BLM.

14. Transportation planning areas were available and used to evaluate the implications of alternatives to transportation efficiency and cost.

15. Economic data was derived from RPA, Regional direction, or Forest statistics.

16. Information on Wild and Scenic Rivers was based on an inventory conducted by the National Park Service in 1980, supplemented by Forest staff review.

III. THE FOREST PLANNING MODEL

A. Overview

Forest planning is a complex process in which a large amount of information and interdependent decisions must be considered before an alternative management plan can be recommended as the one which best addresses the issues, concerns, and opportunities which were identified at the outset of the planning problem. Because of this, several interrelated computer models and analytical tools have been developed and utilized to help determine the decision space within which alternatives can be developed and to evaluate their associated outputs and effects.

One of these models is called FORPLAN. The name is an acronym for Forest Planning Model. FORPLAN is a computerized linear programming model which has its roots in RAM (Resource Allocation Model) and MUSYC (Multiple-Use Sustained Yield Calculations). It is composed of a matrix generator, a linear programming solution system (FMPS), and a report writer. Within the bounds of the matrix generator and the FMPS solution package, the user is allowed a great deal of latitude in formulating the mathematical representation of the Forest planning problem to be analyzed. The Wallowa-Whitman Planning Team played a role in debugging and testing the early versions of the FORPLAN software system. Since then, several releases of two different versions of the model have been developed. The bulk of the Forest modelling was performed with Version I, Release 14. The system is maintained and operated at the USDA Computer Center in Fort Collins, Colorado.

The Wallowa-Whitman FORPLAN model was specifically designed to help the Interdisciplinary Planning Team analyze the economic and production tradeoffs associated with the recreation, timber, visual, and wildlife resources, and to help evaluate the extent to which various alternative management scenarios were able to address and resolve the identified planning issues. One key step in the development of the FORPLAN Model was to divide the total Forest into "analysis areas". Analysis areas are tracts of land with relatively homogeneous characteristics in terms of the outputs and effects that are being analyzed in the FORPLAN Model.

Their delineations are intended to capture the significant social, biological, and economic differences in the way the land responds to alternative management strategies. And, of course, the focus of the delineations was upon the planning issues.

In the FORPLAN model, analysis areas were allocated to management emphases in order to achieve the resource management objectives of a particular benchmark analysis or alternative. "Management emphasis" is a FORPLAN term and is directly related to the "management strategy" described in the DEIS. Each management strategy contains a set of standards and guidelines addressing how the resources in that particular allocation are to be managed in order to meet particular multiple use objectives. From one to nine different management emphases were available to each analysis area depending upon its resource production opportunities.

In turn, more specific "FORPLAN prescriptions" were developed to achieve the multiple use objectives of each management strategy. FORPLAN prescriptions are combinations of management emphasis and intensities which specify a schedule of activities and practices, and their associated outputs and effects. The outputs and effects associated with the prescription choices are represented as mathematical coefficients in the respective decision variables. FORPLAN had from one to eight prescriptions to choose from for each management emphasis for each analysis area. In general, each analysis area contained from one to twenty-four prescription choices. Most mature-timber analysis areas were represented by 16 to 21 prescriptions.

Which prescriptions FORPLAN selected depended upon the objective function and the set of constraints used to represent a particular benchmark or land management plan alternative. The objective function was usually to maximize present net value or maximize the production of timber. These were subject to first satisfying all the specified constraints. The constraints were designed to guarantee the spatial and temporal feasibility of land allocation and harvest scheduling choices in order to achieve the multiple use objectives of a benchmark or alternative. Once the model had determined that a feasible solution existed by satisfying all of the constraints, it would then search for the set of prescriptions and timing choices which permitted it to optimize the solution according to the specified objective function.

B. The Analysis Process and Analytical Tools

As directed in the Planning Regulations (36 CFR 219.12(f)(8)):

> "Each alternative shall represent to the extent practicable the most cost efficient combination of management prescriptions examined that can meet the objectives established in the alternative."

The Interdisciplinary Team analyzed economic efficiency at several stages of the planning process in order to be reasonably assured that the alternatives developed and displayed in the DEIS complied with the intent of this direction. The discussion of the analytical process and tools used will follow this general outline:

1) Analysis prior to FORPLAN,
2) How FORPLAN was used in the analysis,
3) Analysis done in addition to FORPLAN model analysis.

Once the issues, concerns, and opportunities were identified, and the planning criteria were developed, the Interdisciplinary Team began to formulate management strategies and their associated standards and guidelines. This step was one of the more difficult and laborious, and possibly the most important task of the interdisciplinary planning process. Management strategies coupled with their respective standards and guidelines provide specific direction for implementation, and serve as a framework for how to use, develop, and protect the Forest's resources in a manner consistent with the goals and objectives of the Plan.

Concurrently with the formulation of management areas and the standards and guidelines, the Interdisciplinary Team also began to identify the analysis areas that would be used in the FORPLAN model (see Section III C). For this task, the Total Resource Information (TRI) System's 2000 (S2K) Forest data base was augmented with information on land types and suitability on various 1" per mile overlays with appropriate combinations stored on the Forest's computer. A sort-merge program was used extensively to analyze different analysis area combinations that could be used to model and evaluate the production and economic tradeoffs between the recreation, timber, visual, and wildlife resources on the Forest. The objective of this exercise was to delineate the analysis areas in such a way as to capture the important variations in the biological, social, and economic characteristics of the land and yet keep the FORPLAN model size to a minimum so it was quicker and less expensive to run.

Once the final analysis area delineation was settled, the next step was to develop the prescriptions for the FORPLAN model. This included the development of timber yield tables (see Section III E), other resource yield coefficients, and the economic costs and benefits (see Section IV) associated with each FORPLAN prescription. These prescriptions were designed to enable FORPLAN to analyze the timber-related outputs and effects associated with alternative land allocations and multiple use objectives.

To provide FORPLAN with the timber harvest scheduling flexibility it needed to satisfy the multiple use objectives of each alternative, a wide range of timber yield tables was developed for each management area and working group combination. The development of existing stand yield tables was based on the Region 6 Empirical Yield Table Processor and linear regression analyses of 1979 National Forest Inventory (NFI) plot data. The managed yield tables were developed with the stand PROGNOSIS computer program.

Professional judgment played an important role in determining the reasonability of the results from the growth and yield predictive models. As the yield tables were developed, they were reviewed by the respective resource specialists to determine if they achieved their intended objectives (e.g., thermal cover or retention foreground). A soil expectation value was calculated for each. In some cases prescriptions were dropped if another prescription achieved the intended objectives equally as well but had a higher present net value. But for the most part, if FORPLAN had the room and the prescriptions contributed to the range in scheduling choices, they were included in the model so it had the option of using them to satisfy its objective function and constraints.

Timber stumpage values and logging costs were based on an analysis of timber sale data (2400-17 Forms), Cut and Sold Reports, and consultation with Forest logging specialists. Costs for reforestation, site preparation, timber stand improvement, sale preparation and other timber management related activities were developed by the timber staff and silviculturists based on recent experience and anticipated future conditions.

The development of recreation output coefficients was based on an analysis of the Forest Recreation Inventory Management (RIM) data base. Capital investment, and operation and maintenance costs were based upon recent budgets, use figures, the stated objectives of the HCNRA Comprehensive Management Plan, professional judgment as to how recreation patterns would react to alternative levels expenditures.

FORPLAN was used to analyze the production and tradeoffs between the recreation, timber, visual, and wildlife resources on the Forest. The model was designed to analyze the most economically efficient timber-related outputs and effects associated with the achievement of the multiple use objectives of an alternative. The wildlife, recreation and range outputs and effects associated with that same alternative were evaluated with the use of an electronic spreadsheet.

The land allocation and resource management investment options which resulted in the most economically efficient solution was determined through iterative model and spreadsheet analyses. For example, the Maximum Present Net Value (PNV) Benchmark (market plus assigned values) was arrived at by first examining the solution to the Maximum PNV Benchmark (market values only) and adding the costs and benefits associated with nonmarket outputs.

The other benchmarks were analyzed with FORPLAN through combinations of different objective functions (maximize timber or maximze present net value) and constraints on harvest flow, rotation length, minimum management requirements (MMR's), and discretionary constraints needed to achieve the respective multiple resource objectives. (Refer to Section VI.) Again, the FORPLAN analyses were augmented with a spreadsheet analyses of the wildlife, recreation, range, and other resource management options.

Once the benchmark analyses were completed, the Interdisciplinary Team proceeded to evaluate the range of alternatives that were developed to address the issues, concerns, and opportunities. (Refer to Section VII.) Each issue, concern and opportunity was addressed in the alternatives through land allocations, timber harvest scheduling, standards and guidelines, or policy statements. Alternatives were modeled through the specification of an objective function and a set of constraints that were necessary to achieve the intent of a particular alternative.

The objective function was usually to maximize present net value. This guaranteed the economic efficiency of the timber harvest solution once all of the specified constraints were satisfied. The analysis of which wildlife, recreation, and range management program most efficiently met the objectives of the alternative was performed with an electronic spreadsheet.

In addition to the objective function, many constraints were specified in order to achieve the multiple use objectives of each alternative. These included:

1) constraints on timber harvest flow, rotation length, and ending inventory;

2) dispersion and wildlife MMR constraints;

3) constraints on the amount of analysis areas available to certain management area prescription sets;

4) rate of timber harvest constraints in scenic viewsheds and intensive recreation allocations;

5) constraints for thermal cover on elk winter range allocations; and

6) other miscellaneous constraints such as accelerated lodgepole pine harvesting, species mix, and funding levels.

Once these constraints were satisfied, the model was then able to search for the solution which best achieved its objective function.

The FORPLAN analysis was followed up by several other analytical steps in the process of evaluating alternatives. Three of these additional analytical tools were software programs developed by the Interdisciplinary Team to generate custom reports. One program (see Appendix G) interpreted the dynamics of the FORPLAN Forest inventory in terms of five successional stages by working group for fifteen decades. This better enabled the wildlife biologist to evaluate the effects of the harvest schedule solution on the habitat requirements of certain key indicator species. A second program disaggregated the FORPLAN solution between the proclaimed Wallowa and Whitman National Forests. The third program integrated costs and benefits from FORPLAN with those modeled outside FORPLAN to generate the total PNV for a given alternative.

Sometimes the results from these additional analyses indicated the need to do more FORPLAN runs in order to improve the overall evaluation of the outputs and effects of a particular alternative. Once the Team was satisfied with the outputs and effects of the alternatives, their implications with regards to income and jobs in the local economy were analyzed with the IMPLAN input/output model (see Section V). The Interdisciplinary Team along with the Forest Management Team then evaluated how well each alternative addressed the issues, concerns, and opportunities that were identified at the outset of the planning process. Based on this analysis, the Regional Forester selected his preferred alternative.

C. Identification of Analysis Areas

One of the first steps in the development of FORPLAN (Forest Planning Model) was to divide the Forest into analysis areas. For this task, the TRI (Total Resource Information) System 2000 database was used extensively. Analysis areas are tracts of land with relatively homogeneous characteristics in terms of the outputs and effects that are being analyzed within the FORPLAN model. They serve as the basic unit of land in the model for which a range of prescriptions are developed to achieve various multiple use objectives. Their delineations were intended to capture the significant social, biological, and economic differences in the way the land responds to alternative management strategies, and yet keep the model size to a minimum so that it was quicker and less expensive to perform analysis. The focus in delineating analysis areas was on addressing certain issues, concerns, and opportunities identified at the outset of the planning process. Incorporation of the existing Forest inventory model was necessary to link FORPLAN to inventoried volumes and growth projections for existing stands.

The Interdisciplinary Team began developing the FORPLAN model during March 1980. Since then, and as the planning process has evolved, several different analysis area stratifications and model formulations have been explored. The land stratification that was used for this DEIS is discussed in Appendix E. It divided the 2.35 million acres of the Wallowa-Whitman National Forest into 355 analysis areas. Of these, 147 account for the 1.08 million acres of suitable and available forested land from which FORPLAN can schedule timber harvesting. In general, most analysis areas are larger than 200 acres. The largest is 97,792 acres. They are often not contiguous. The following discussion presents the rationale behind the identification and delineation of the analysis areas according to the six FORPLAN levels of analysis area identifiers.

Identifiers and Objective Functions

The analysis area identifiers which were used in FORPLAN are stratified at six levels in a hierarchical fashion. That is, each additional level is an increasingly more detailed descriptor of the level above. Level 1 identifiers are primarily geographic, recognizing important legally established boundaries.

1 EC WLD - Eagle Cap Wilderness

2 HC WLD - Hells Canyon Wilderness

3 ALLOTH - Wallowa-Whitman National Forest lands exclusive of Wilderness, Wild River, Scenic River and National Recreation Area

4 NRAOTH - Hells Canyon National Recreation Area: outside of Wilderness or Wild River or Scenic River

5 MMTWLD - Monument Rock Wilderness

6 NFKWLD - North Fork John Day Wilderness

7 WLDRIV - Snake Wild River

8 SCENER - Snake Scenic River

Level 2 identifiers are further geographic splits of Level 1 identifiers.

1 EC ADD - Eagle Cap Additions/Oregon Wilderness Bill

2 EC OTH - Eagle Cap Wilderness in existence prior to Oregon Wilderness Bill

3 HC ADD - Hells Canyon Additions/Oregon Wilderness Bill

4 HC OTH - Hells Canyon Wilderness existing prior to Oregon Wilderness Bill

5 G ROND - Unroaded portion of the Grande Ronde River drainage. Substantial additional road construction is necessary to access timber in this area

6 LAKEFK - Unroaded portion of the Lake Fork Creek drainage. Substantial additional road construction is necessary to access timber in this area

7 MONUMT - Monument Rock Wilderness

8 BALDY - Wallowa-Whitman portion of North Fork John Day Wilderness.

9 OREGON - Subsets of NRAOTH or ALLOTH lands in Oregon.

10 IDAHO - Subset of NRAOTH lands in Idaho.

Level 3 identifiers are capability areas. They include combinations of the timber working groups, and the land types as used in unit planning (see below). These land types have been refined by making high elevation land types S1, S2, and G5 consistent with those areas mapped as high elevation regeneration difficulty or areas of high elevation that are unsuited because of soil instability. The pattern interpretations of S3, S4, and S5, and G2, G3, and G4 have been refined and are significant to the interpretation of inherent cover-forage relationships. An additional identifier of "H" was added to the steep land types to identify those areas where the need for helicopter or long-span skyline logging systems has been identified.

Land Type G2

Flat basalt plateaus, gently sloping ridgelines, and valley bottoms which are predominately timbered (over 70 percent), and generally found below 6,000 feet elevation. Gentle terrain and a wide variety of vegetation permit a wide range of possible uses and activities. Nearly all wildlife species indigenous to the Forest, game and nongame, are found. This land type provides important livestock grazing. Because timber harvest is relatively uncomplicated (mechanically), this type has historically had high timber harvest priority.

Land Type G3

Gentle topography, marginal timberlands, a mixture of land types G2 and G4. Scablands and open grassland make up about 50 percent of the area, while the remainder is timbered. Each cover type is rather evenly distributed, creating a large amount of "edge," valued as important habitat for deer as well as other wildlife.

Land Type G4

Flat grassland, scablands and "biscuit lands" found on basalt plateaus or benches. Timber is limited to thin stringers along fault lines, comprising less than 30 percent of the total area.

Land Type G5

Flat basalt plateaus and gently sloping granitic ridges and basins which are predominately timbered (over 70 percent) and generally found at 5,400-7,000 feet elevation. The terrain is gentle with an upper forest association normally dominating the overstory (spruce, subalpine fir, white fir, western larch, lodgepole pine). Timber harvesting is limited because of the lower valued timber, its slow growth, and difficulty in establishing new stands of trees.

Land Type S1

Typical of the high Wallowa, Elkhorn and Seven Devils Mountains, and similar to many of the alpine areas throughout the northwestern United States. The terrain is very rugged, generally over 60 percent slope, with rock outcrops dominating the landscape. Snow remains yearlong on a few of the high elevation north aspects. Some gently sloping basins with meadows or small lakes are present. High elevation tree species occur in small pockets and between avalanche paths. Considered highly scenic, these areas provide much of the memorable visual experience of the Eagle Cap Wilderness. Elevations and landform combine to greatly limit the range of management opportunities.

Land Type S2

Steep (over 35 percent slope), often immediately below the alpine type (S1) and within what could be termed the "upper forest." The principal tree species are subalpine fir, lodgepole pine, white fir and aspen. Elevation limits wood fiber and forage production; all forest lands within this land type have been identified as potential regeneration difficulty areas due to cold soils, cold air drainage and frost pockets. This type includes forest land classified as unsuited due to extreme soil instability.

Land Type S3

Steep (over 35 percent slope) continuously timbered. Slope shapes are relatively smooth, less dissected than land types S2 or S4 and have few rock outcrops. Nearly every major tree species found in the Forest can be found in this type.

Land Type S4

Characterized by steep slopes (over 35 percent), heavily timbered and brushy north aspects, timber or grass on east and west aspects and grass type on south aspects. Included are stringer meadows and streams in some canyon bottoms. This land type is made up of many small steep canyons tributary to the major canyons. There are many rock outcrops, rims and occasional talus slopes. Alternating timber and grassland (approximately 50 percent of each), as the aspect of the tributary canyons change, give a striped pattern to this landscape which is common to much of the Blue Mountains.

Land Type S5

Characterized by steep (over 35 percent slope), predominantly open grassland. Timber or brush type is found on some north or east aspects but make up less than 30 percent of the area.

> This land type occurs on south, east and west aspects of major canyons but is occasionally found on north aspects, particularly at lower elevations. This area provides usable forage for grazing animals, but because of the sensitivity of the soil on the steep slopes and narrow bottoms, proper grazing on this land type requires intensive management. Approximately 10 percent of the area is in basalt rimrock, which impairs management activities.

The second part of the capability area descriptors identify working groups. Because of limits on the number of Level 3 identifiers, all unsuited timberlands are identified as UN. These areas are more precisely split out at the working group level. High elevation regeneration difficulty is identified by the high elevation land types. All other working group abbreviations within the capability areas of Level 3 are redundant to the working group level. The capability areas (Level 3 identifiers) are identified in Table B-1.

Table B-1
LEVEL 3 IDENTIFIERS

FORPLAN Ref. Nos.	Capability Area Descriptor	FORPLAN Ref. No.	Capability Area Descriptor	FORPLAN Ref. Nos.	Capability Area Descriptor
1	G2 CD	21	G5 GR	41	S3H UN
2	G2 CW	22	S1 UN	42	S3H GR
3	G2 LP	23	S1 GR	43	S4 CD
4	G2 UN	24	S1 NV	44	S4 CW
5	G2 GR	25	S2 CW	45	S4 UN
6	G2 NV	26	S2 UN	46	S4 GR
7	G3 CD	27	S2 GR	47	S4 NV
8	G3 CW	28	S2H CW	48	S4H CD
9	G3 LP	29	S2H LP	49	S4H CW
10	G3 UN	30	S2H UN	50	S4H UN
11	G3 GR	31	S2H GR	51	S4H GR
12	G3 NV	32	S3 CD	52	S5 CD
13	G4 CD	33	S3 CW	53	S5 CW
14	G4 CW	34	S3 LP	54	S5 GR
15	G4 UN	35	S3 UN	55	S5H CD
16	G4 GR	36	S3 GR	56	S5H CW
17	G4 NV	37	S3 NV	57	S5H UN
18	G5 CW	38	S3H CD	58	S5H GR
19	G5 LP	39	S3H CW	59	S5H NV
20	G5 UN	40	S3H LP	60	XXXXXXXX

The working groups are important for the differences in productivity and species mix.

CD - Douglas-fir and ponderosa pine community types, except those stands dominated by lodgepole pine.

CW - White fir, subalpine fir and Engelmann spruce community types, except those stands dominated by lodgepole pine.

LP - All lodgepole pine-dominated stands.

CD-B - Douglas-fir and ponderosa pine having potential for severe brushfield competition after regeneration harvest.

CW-UNS - CW working groups unsuited for timber management because of shallow soils (77 percent) or soil instability (23 percent).

LP-UNS - LP working groups unsuited for timber management because of shallow soils (53 percent) or soil instability (47 percent).

GRASS - Nonforest, grassland, scabland, meadow.

NONVEG - Rock, talus, cliffs, etc.

CD-UNS - CD working groups unsuited for timber management because of shallow soil.

Land classes are G (ground-based logging systems), S (short-span skyline) or H (helicopter or long-span skyline). These classes are key to the logging costs differentiation in the economics tables. The information they provide is the same as slope information provided by the Level 3 identifiers. This redundance does not increase model size and provides desirable report summaries.

Condition classes are descriptive of the preferred silvicultural treatment. The condition classes are:

> REGEN - Mature stand, eligible for regeneration harvest, includes all old-growth timber.
>
> REFOR - Reforestation opportunity - not necessarily reforestation backlog in that many of these acres are already scheduled for reforestation, but not forested at time of data collection.
>
> COMTHN - Young tree stand, eligible for commercial thinning, may have scattered large overstory.
>
> PRECOM - Very young tree stand, eligible for precommercial thinning.
>
> OVERWD - Scattered large overstory over very young stand, eligible for overwood removal followed by precommercial thinning.
>
> FBROPP - Stagnated pole or smaller stands, representing an opportunity to harvest wood fiber if economically feasible.
>
> MULTI - Multi-treatment is an irregularly mixed stand encompassing two or more of the above conditions.

A typical example of an analysis area available for timber harvest defined by the above identifiers is:

> ALLOTH OREGON S3 CW CW S REGEN

This describes a mature ("REGEN") stand of timber growing on a steep, uniformly timbered ("S3 CW"), true fir ("CW/CE") community type, loggable by shortspan skyline ("S") in Oregon ("OREGON"), outside of wilderness, wild river or Hells Canyon NRA ("ALLOTH").

D. Identification of Prescriptions

1. Overview

The National Forest Management Act (NFMA) regulations define management prescriptions as "management practices selected and scheduled for application on a specific area to attain multiple use and other goals and objectives" (36 CFR 219.3). Management prescriptions consist of a goal statement which establishes the purpose of the prescription and a compatible set of management practices designed to develop and/or protect some combination of resources, and create or perpetuate a desired condition. Prescriptions were constructed within the requirements specified in 36 CFR 219.27. These requirements guide the development, analysis, approval, implementation, monitoring and evaluation of Forest Plans with regard to:

(a) Resource protection
(b) Vegetative manipulation
(c) Silvicultural practices
(d) Even-aged management
(e) Riparian areas
(f) Soil and water
(g) Diversity

The process of identifying and subsequently developing management prescriptions began with an Interdisciplinary Team review of the issues, concerns, and opportunities (ICO's). Prescriptions were then identified to help address those ICO's which were related to decisions regarding standards and guidelines, scheduling, or land allocations. There were other ICO's which were to be addressed through policy statements for which it was not appropriate to develop prescriptions.

Standards and guidelines represent the necessary mitigation and resource coordination measures that are required by existing laws, regulations, and policies. Essentially, they provide the guidelines for how prescriptions are to be implemented on the ground. Scheduling and land allocation related to ICO's were addressed with the FORPLAN model. For this purpose, coefficients of outputs and effects were constructed for the appropriate management prescriptions. These were then cast in terms of FORPLAN prescriptions. The model was then used to evaluate the implications of alternative scheduling and land allocation choices with regard to addressing the relevant ICO's.

Once the need and purpose for certain types of prescriptions were identified, goal statements for each management prescription were designed to respond to the questions raised by the ICO's. The Interdisciplinary Team then used professional judgment, evaluated existing policy, legislative direction, and research for guidance in developing multiple resource management prescriptions. The resulting set of prescriptions represents a broad range of resource management emphases, practices, and capital investment levels. General policies, standards, and guidelines were also written by the Interdisciplinary Team to cover practices common to all prescriptions and resource management situations that are Forest-wide in scope.

In addition to addressing ICO's, the process of designing management prescriptions was also guided by the following criteria: (1) prescriptions should be achievable and contain realistic practices, (2) they are to be general enough to accommodate the variable site-specific conditions on the ground, (3) they should be specific enough for the Interdisciplinary Team to develop accurate resource and economic output and effects coefficients, and (4) to the extent practicable they should be the most cost effective means of achieving the intent of the prescription.

In order to explore a wide range of alternative ways to manage the Forest for its multiple uses, the Interdisciplinary Team identified the capability of each analysis area to produce certain goods and services that were being analyzed within the FORPLAN model. All prescriptions which were related to the production of goods and services capable of being produced from an analysis area were then assigned to it. The assignment criteria focused primarily on the geographical, physical, and biological characteristics of the analysis area as related to its ability to provide different types of recreation, visual, wildlife, and wood outputs. Which prescriptions and schedule of activities the model selected depended upon the multiple use objectives and constraints of the alternative being analyzed.

2. Purpose, Criteria, and Assumptions for Prescription Categories

Prescriptions were developed for each of the eighteen management strategies to which different parts of the Forest could be allocated. For each management strategy a resource management goal and the general objectives to achieve a desired future condition are described. Management practices are implemented within each prescription according to the resource management goals of the prescription and the standards and guidelines. A map of the land allocation to each management strategy is available for each alternative. This map in conjunction with the associated prescriptions, and the standards and guidelines identify what activities will take place, where, and when during the implementation of any one alternative.

Eighteen management emphases were modeled in FORPLAN for the Wallowa-Whitman National Forest. These are broken into several categories.

Management emphases in which MINLVL (no scheduled timber harvest) is the only management intensity provided. They are:

EXROAD - Acres in existing roads
WLDRNS - Wilderness
BCK CO - Backcountry (Management Area 6)
STARKY - Starkey Experimental Forest
INDIAN - Indian Creek Research Natural Area
A LAKE - Anthony Lakes Ski and Summer Homes Area
DNV - Dispersed Recreation/Native Vegetation, Hells
Canyon NRA FOR - Forage, Hells Canyon NRA
OLD GR - Old Growth
RECSIT - Developed Recreation or administration sites

Management emphases in which the full range of even-aged management intensities are allowed:

GNFR 1 (Management Strategy 1) - Harvest is constrained only to meet minimum dispersion standards for regeneration harvest units.

GNFR 2 (Management Strategy 2) - Harvest is constrained to allow better cover development in existing regeneration harvest units before entering adjacent units.

GNFR 3 (Management Strategy 3) - Harvest is constrained to provide near-optimum dispersion of cover for elk.

Management emphases in which selection harvest is the only timber prescription provided. They are:

PHLLPS - Phillips Lake environs managed under agreement with the Bureau of Reclamation.

VISUAL - Foreground retention or partial retention acres.

RIPARI - Riparian zones where selection harvest prescriptions provide for special consideration per NFMA regulations.

Management Emphasis in which choice is allowed between selection harvest and a range of even-aged management prescriptions.

DRT - Dispersed Recreation/Timber Management of Hells Canyon National Recreation Area.

The FORPLAN prescriptions are identified and described in terms of "management emphases" and "management intensities". In most cases, the management emphasis name in FORPLAN is the same as the Management Strategy name used in the DEIS and Forest Plan. For example, GNFR 1 is the name of the emphasis representing Management Strategy 1. This is also true for Management Strategies 2 and 3. Riparian and the Visual Management direction incorporated as part of Management Strategies 1, 2 and 3 are represented as a management emphasis in FORPLAN. The list below depicts these relationships.

Management Strategy	Management Emphases
MS-1 (Timber Emphasis)	GNFR 1 VISUAL RIPARI
MS-2 (Modified Timber)	GNFR 2 VISUAL RIPARI
MS-3 (Big Game Emphasis)	GNFR 3 VISUAL RIPARI
MS-4 (WILDERNESS)	WLDRNS
MS-5 (Phillips Lake Area)	PHLLPS
MS-6 (Undeveloped Dispersed Rec)	BCK CO
MS-7 (Recommended W & S Rivers)	BCK CO
MS-8 (Snake River Corridor)	WLDRNS
MS-9 (HCNRA Dispersed Recreation/ Native Vegetation)	DNV
MS-10 (HCNRA Forage)	FOR
MS-11 (HCNRA Dispersed Recreation/ Timber)	DRT
MS-12 (Research Natural Areas)	INDIAN
MS-13 (Homestead Further Planning)	FOR
MS-14 (Starkey Experimental Forest and Range)	STARKY
MS-15 (Old Growth)	OLD GR
MS-16 (Administrative and Recreation Sites)	RECSIT
MS-17 (Power Transportation)	Not in FORPLAN
MS-18 (Anadromous Fish)	GNFR 3

E. Development of FORPLAN Timber Prescriptions

1. The Management Practices and FORPLAN Management Intensities

Section III D above describes the eighteen management strategies and their associated prescriptions. It also discussed the relationship between the management strategies and the Forest-wide Standards and Guidelines. This section will summarize the development of FORPLAN timber prescriptions and their relationship to the Management Strategies.

Once the management strategies were identified which were needed to address the Planning ICO's, the ID Team determined which of them could have their objectives achieved through scheduled (regulated) timber harvesting. Of the eighteen management strategies depicted above, six of them included scheduled timber harvesting prescriptions which were analyzed within the FORPLAN model. These included:

Management Strategy 1
Management Strategy 2
Management Strategy 3
Management Strategy 5
Management Strategy 11
Management Strategy 18

The Management Strategies 4, 7, 8, 12, and 15 do not permit any timber harvesting, while the remaining areas permit timber harvesting on an unregulated basis. None of these Management Areas required the development of harvest scheduling prescriptions for FORPLAN.

The silvicultural options that were developed for each of these management emphases are referred to as "management intensities" in FORPLAN. They reflect the different combinations of practices, and the different timing choices for implementing those practices. In essence, they represent alternative investment levels in timber management to achieve the objectives of a management area. The list below depicts some of the management practice terms used to describe the various management intensities considered for each management emphasis. Not all practices that will be implemented as part of a prescription are included in this list.

Management Practices	Practice Abbreviation
Natural Regeneration	NAT
Plant	PLT
Precommercial Thin	P
Commercial Thinning	C
Harvest (Shelterwood or Clearcut)	H
Selection Harvest	SELECT

The next step was to develop and analyze a range of silvicultural prescriptions for each working group and management area combination. This included the development of both empirical and managed yield tables. The empirical yield tables are used to portray alternative silvicultural treatment options for existing mature and immature sawtimber stands. They are called empirical because they are based on National Forest Inventory (NFI) plot data. The managed yield tables apply both to existing plantations, generally not older than 20 years, and to future managed stands which result from the regeneration harvesting of existing natural stands. The silvicultural prescriptions and their associated yield tables were developed based on the silvicultural characteristics of each working group and the stand management objectives for each individual management strategy.

Once the vegetative management objectives were identified for each management strategy, the appropriate Interdisciplinary Team members would work together to develop a range of harvest scheduling options. The overriding criteria in this process was that the silvicultural prescription and its associated yield table achieve the vegetative management objectives for the Management Area. However, other criteria were also considered. One of them was that a range of scheduling timing choices, rotation ages, and investment levels were examined, and whenever possible made available to the FORPLAN model. For example, the model was given three different silvicultural regimes to choose from when deciding how to manage lodgepole pine plantations within Management Strategies 1, 2, 3 and 18. Seven different silvicultural regimes were allowed in establishing and managing other coniferous plantations. Each had different schedules of silvicultural practices and rotation lengths. All achieved the intent of the respective Management Strategies. The only differences among Management Strategies 1, 2, 3 and 18 were the spacing arrangement of harvest units.

Finally, there were situations in which the vegetative management objectives for a management prescription were so specific that the range of silvicultural regimes that could achieve those objectives was very limited. This was true for the VISUAL Management Emphasis, PHLLPS Management Emphasis and RIPARI Management Emphasis.

2. Management Intensity

Minimum level (MINLVL) is the only management intensity permitted within certain emphases noted above. It is also the only intensity provided for nonforest and unsuited forest lands within other management emphases. To assure economic efficiency, minimum level is available as a management intensity option under all management emphases.

The remaining management intensities reflect different investment strategies primarily for harvesting timber. (The stated rotation age is at least .95 CMAI in Benchmark Runs 2, 3, 4, and 5.) They are:

PLTPCH - Plant, precommercial thin, commercial thin and harvest (80-year rotation in CD, CW).

PLT PH - Plant, precommercial thin and harvest (70-year rotation in CD and CW).

PLT CH - Plant, commercial thin and harvest (100-year rotation CD, 110 in CW).

PLT H - Plant and harvest only (60-year rotation in CD, 80 in CW).

NATPCH - Natural regeneration, precommercial thin, commercial thin and harvest. (90-year rotation in CD, CW; 70 in LPP).

NAT PH - Natural regeneration, precommercial thin and harvest (80-year rotation in CD, CW; 50 in LPP).

NAT H - Natural regeneration and harvest only (70 year rotation in CD; 90-year rotation in CW and 80 year rotation in LPP).

Selection harvest is a management intensity that is applied to riparian zones, visual foregrounds, the Phillips Lake area, and is an option in the dispersed recreation/timber allocation in Hells Canyon NRA. As applied to riparian zones it is a modeling prescription only, intended to limit the rate of harvest sufficiently to allow for "special consideration."

The "plant" management intensities are more properly described as "full stocking" management intensities. They assume that many of the existing timber stands will be naturally regenerated and still achieve objectives of full stocking within five years. Twenty-two percent of the CD working group and 28 percent of the CW working group could be naturally regenerated based on the judgment of the District silviculturists on gentle (tractor) ground.

The natural regeneration prescriptions are a pure natural regeneration management intensity where essentially no acres will be planted. (An allowance of 5 percent was made for the very unusual case when a lodgepole stand must be planted.) Areas that are understocked will be allowed to remain understocked.

Intermediate-type options such as interplanting or supplemental planting following a period of natural regeneration were analyzed outside of FORPLAN and eliminated. The option of planting (full stocking assuming natural regeneration on all acres where silviculturally sound) proved to be as economical as any of the intermediate options considered.

Cost efficiency was a consideration for the development of all prescriptions. For example, if a prescription involved timber harvesting, the goal statement for the timber management standard and guideline called for the optimum production of wood consistent with various resource objectives, environmental constraints, and economic efficiency. Therefore, prescriptions were developed with enough flexibility to permit one practice to be selected over another if it proved to be more cost effective in achieving the objectives of the prescription.

Pursuant to the intent of 36 CFR 219.14 (b) and (c), economic efficiency was also considered in the development of the FORPLAN prescriptions for each management strategy which permitted scheduled timber harvesting. In many cases a wide range of alternative silvicultural regimes was developed and made available to FORPLAN for a particular management strategy. These represented different schedules of management practices, outputs and effects, and economic consequences. The model could then select which prescriptions most efficiently achieved the objectives of the alternative. More detailed summaries of prescriptions by analysis area are available at the Supervisor's Office, Baker, Oregon.

3. Range of Timber Management Options Considered

As discussed in Section III C, analysis areas were delineated in part by four working group identifiers (CD, CW, LP, and CD-B) and seven existing vegetative condition classes (REGEN, REFOR, PRECOM, CONTHN, OVERWD, MULTI AND FBROPP. These analysis area identifiers depicted stands which were classified as suitable and available lands for timber harvesting. FORPLAN timber management prescriptions were developed for every combination of management emphases which called for scheduled harvesting and analysis areas which contained suitable and available forested land. For any one prescription, the Model was also offered several timing choices on when to implement it. Also, for each management emphasis and analysis area combination which involved timber harvesting options, the Model could also select a prescription which called for no programmed harvesting. This prescription was used as the final economic suitability test. All in all, FORPLAN could select from any of 40,000 to 50,000 prescription/timing choice options to meet its objectives for a particular alternative.

The silvicultural prescriptions and their associated yield tables that were developed for these analysis areas were based on regression analyses of the timber inventory data plus professional judgment. As would be expected, the older the stand, the fewer the silvicultural options that were realistically available to manage it. For example, in most cases the only option left for a mature stand was to harvest it and start a new managed stand. The prescriptions for two-storied stands (OVERWD) consisted of either a final harvest or an overstory removal. The residual stand was then allowed the several options available to a newly established plantation. Precommercial thinning (PRECOM) stands offered more options. Several patterns of precommercial/commercial thinning combinations were possible, or they could be harvested and regenerated. In total, the model contained 29 optional yield tables for existing stands.

Managed yield tables were developed for prescriptions involving analysis areas in the reforestation or precommercial thinning condition (i.e., existing plantations), and for future managed stands resulting from the conversion of existing natural stands. Twenty-three managed yield tables were included in FORPLAN.

The prescriptions included in the FORPLAN model covered a wide range of timber management options:

a. Plant Harvest (PLT H)

b. Natural Regen-Harvest (NAT H)

c. Plant-Precommercial Thin-Harvest (PLTPH)

d. Natural Regen-Precommercial Thin-Harvest (NATPH)

e. Plant-Commercial Thin-Harvest (PLT CH)

f. Plant-Precommercial Thin-Commercial Thin-Harvest (PLT PCH)

g. Natural Regen-Precommercial Thin-Commercial Thin-Harvest (NATPCH)

The full range of management intensities was available for the GNFR 1, GNFR 2, and GNFR 3 management emphases. The other management emphases were usually restricted to selection harvest due to the specifics of their objectives.

F. Development of Per Acre Yield Coefficients

FORPLAN evolved to consist primarily of a wide range of harvest scheduling prescriptions which were designed to achieve the multiple use resource management objectives associated with the various management area land allocation choices. In this section we will summarize the processes used to develop the resource outputs and effects coefficients used in the final version of the FORPLAN model. Even though the timber and recreation resources were at the heart of many planning issues and together accounted for over 95 percent of the present net value associated with any of the alternatives, the outputs and effects of many other resources were also evaluated for each alternative. These include the energy, minerals, range, soils, visuals, wildlife, and water resources. The development of the coefficients for energy, minerals, and water will not be covered in this discussion. For the details regarding these resources, refer to process records in the Supervisor's Office. Appendices F and G of this DEIS further describe sediment and wildlife coefficients.

Finally, the process for developing the economic cost and benefit coefficients for the FORPLAN prescriptions will be presented in Section IV of this Appendix.

1. Timber Yield Coefficients

The development of timber yield tables was an important step in the Wallowa-Whitman National Forest planning process. They are a component of the FORPLAN model which is used to calculate the allowable sale quantity, long-run sustained yield, and schedule of timber harvest activities. An Interdisciplinary Team of wildlife biologists, landscape architects, economists, silviculturists, and timber management personnel at the Ranger District, Forest, and Regional Office levels were involved in the process. The yield tables were reviewed at several points. Initial review was made by District personnel who compared the tables with their personal experiences on the ground. Other reviews were made by researchers, neighboring Forests, and industry silviculturists.

Yield coefficients were developed for all management strategy prescriptions and analysis area combinations which permitted regulated timber harvest scheduling. This involved the development of both empirical yield tables for existing sawtimber stands, and managed yield tables for existing plantations and future managed stands. They will be discussed separately in the following sections.

Timber yield tables for existing stands include regeneration harvest-only and intermediate entry options. Regeneration harvest-only volumes are from empirical yield tables developed by the Regional Office. Intermediate harvests are modeled as follows:

CD and CW COMTHN condition classes receive harvest of 30 percent of existing empirical volume the first decade. Residual volume recovers at the rate of 5 percent per decade so that seventh decade volumes are the same as shown in the empirical tables.

CD and CW OVERWD condition classes receive harvest of 100 percent of existing empirical volume (9" dbh-6" dib) and show managed yields equivalent to entry of yield tables for regenerated stands at an assumed age class 2.

CD FBROPP condition classes receive harvest of 100 percent of existing empirical volume (9" dbh-6" dib) and access yield tables for no cultural treatment at an assumed physiological age class 4. No cultural treatment tables are accessed on the assumption that it will not be possible to gain stocking level control of the residual stand.

CW MULTI was modeled as a regeneration harvest-only prescription.

All existing precommercial thinning and reforestation condition classes access managed yield tables identical to the regenerated stand yield tables appropriate to the selected management intensity.

Selection harvest yield tables were developed by converting hypothetical 100-acre stands to a managed condition through group selection, maintaining a minimum average basal area (BA) across the 100 acres. This minimum BA was 70 square feet for immature CW, 90 square feet for mature CW, 55 square feet for immature CD and 60 square feet for mature CD. Because of the relatively low confidence level in this kind of model all existing condition classes were grouped as either mature or immature.

Other constraints which applied to this modeling of selection harvest were: 1) minimum volume of 2,000 board feet (350-385 cu. ft.) per entry, and 2) 20 percent reduction in the basal area and volumes projected from managed yield tables to account for a competition with adjacent trees.

The resulting selection harvest yield tables maintain a relatively constant level of harvest per entry though entry frequency increases, allowing average production to increase from 13-26 cu. ft/ac/yr in the first few decades to 36-40 cu. ft/ac/yr for CD and CW, respectively. These volumes closely approximate estimates from PROGNOSIS for fully managed stands.

2. Timber Yield Coefficients for Regenerated Stands

Yield tables for regenerated stands fall into three general categories: 1) those with precommercial thinning, 2) those without precommercial thinning, and 3) selection harvest. Yield tables were developed using the PROGNOSIS yield simulator.

All yield tables were adjusted to reflect "operational falldown" including nonstockable and nonstocked holes, defect, and breakage. A 10-year lag associated with natural regeneration is provided for in the shelterwood harvest patterns in FORPLAN. LPP tables assume natural regeneration and no regeneration lag.

Yield tables including multiple commercial thinnings following precommercial thinning were not included in FORPLAN. PROGNOSIS showed that maximum production at culmination of mean annual increment occurs following one commercial thinning.

All volumes are rounded off to the nearest ten cubic feet to simplify data entry and increase the accuracy of data proofing. Attempting to carry the third decimal place in FORPLAN data entry results in values being run together into nearly unrecognizable strings of characters.

FORPLAN yield tables assume a two-decade cycle for thinning, with regeneration harvest following the last commercial thinning by two or more decades.

All in all, 23 different timber yield tables were developed for analysis areas in the model.

3. Determining Silvicultural Systems

One of the Forest management's goals is a regulated forest, producing annual harvests at the long-run sustained-yield capacity. The essential requirements of a fully regulated Forest are that age and size classes be represented in such proportions and consistently growing at such rates that an approximately equal annual or periodic yield of products of desired size and quality may be obtained. There must be a progression of size and age classes so that harvestable trees in approximately equal volumes are regularly available. While such a goal may never be achieved because of unforeseeable events, timber harvest schedules are directed at this objective. Determining the long-term sustained-yield capacity and base harvest schedules require adoption of a Forest management method.

Two methods must be considered when selecting a silvicultural method: even-age and uneven-age management. A regulated even-aged forest would be composed of stands of different ages in such proportions and growing at such rates as to assure equal annual or periodic harvest from stands of rotation age.

Even-age management has been the primary method used for sustained yield forestry in the western United States. The concept of even-age management is regeneration, either through clearcut or shelterwood harvest, followed by site preparation and planting or seeding (natural or artificial). Vegetation competing with replacement crop trees is controlled and one or more intermediate harvests may occur before the next cycle begins. These practices have been the subject of intensive research which provides the scientific basis for predicting their results.

Stands not meeting the precisely defined even-age condition are often referred to as uneven-aged stands. A multitude of stand conditions on the Forest fall under this broad definition. Smith (1962) asserts there is need for a restricted definition, arising from the fact that there is not, in the strictest sense of the term, any such thing as an uneven-aged stand. Even when a single large tree dies it is replaced not by one new tree, but by many which appear nearly simultaneously. This is true even if the new trees are from advance regeneration.

Smith also suggests restricting the definition of uneven-aged stands to those containing at least three well-defined age classes. This suggestion is reasonable for the Wallowa-Whitman as stand age classes generally span 20 years and three 20-year age classes would span the shortest expected rotation period.

There is also a need to define when an even-aged group becomes an individual stand and would be managed under the even-age system. Again, Smith suggests that the largest uneven-age opening be taken as that area entirely under the influence of adjacent mature timber. This suggests that environmental factors in the middle of such an area would be the same as for a larger opening. A five-acre minimum even-aged stand size is preferred, primarily as a realistic area for keeping records, and that size would reasonably meet Smith's criteria for conditions on the Wallowa-Whitman.

A regulated uneven-aged forest would be comprised of stands with different aged trees in such proportions and growing at such rates as to assure equal annual or periodic harvest of merchantable trees of all ages. Theoretically, each uneven-aged stand would contain this idealized distribution and thereby constitute an individual sustained yield area. It would not be rational to expect achieving such a complex arrangement of trees over hundreds of thousands of acres. However, it would be reasonable to assume that a broad enough range of uneven-aged stand conditions could be organized and maintained to produce approximately equal annual yields from one portion of the Forest and then another. However, uneven-age management has not been feasibly demonstrated on a significant amount of area in the western United States. Perhaps more importantly, there is little scientific research to predict the response of western species when grown in competition with dominant neighbors over extended time periods.

The obvious difference between group selection and even-age management is the size of the opening created for regeneration. Openings in group selection may be measured in tenths of acres up to several acres in size. Even-aged openings on the Forest would generally be above 20 acres with occasional openings 40 acres or larger in size.

The principal difference resulting from these opening sizes is the amount of edge effect per area harvest. (Edge effect is the portion of an opening where the physical environment is influenced by the adjacent trees.) For example, soil temperature in a harvested area is influenced by shade from adjacent trees; and adjacent trees encroaching into those openings deplete available soil moisture. In small areas the edge effect is 100 percent of the openings, whereas, in large clearcut areas the edge effect may be less than 5 percent of the openings. The survival and growth of tree species in such areas is affected by the size of the openings.

There is a need to distinguish between management and silviculture. Management may be described as the administrative and regulatory process whereby the policies and objectives established for a forest property are attained. Silviculture is generally the science and art of cultivating (i.e., growing and tending) forest crops based upon a knowledge of silvics (Ford-Robertson, 1971). Silviculture is applied to achieve management objectives for each forest property.

Thus the choice of a silvicultural system is made to achieve management objectives. There does, however, need to be a process through which either the management objective or silvicultural method is modified when the biological realities of a site make one or the other infeasible.

The Forest Plan has identified goals and objectives for various parts of the Forest which will require various silvicultural methods. These include such areas as riparian zones, critical habitat for threatened wildlife species, recreation sites as well as lands where timber production is the primary goal. Silvicultural systems must be selected for each of these. The various forms of uneven-aged silvicultural methods may be appropriate where the management goal is continuous forest cover.

Sidel (USDA, 1973) states that silvicultural systems which result in even-aged stands should be used in the grand fir, Douglas-fir, and associated species types if timber production is an important objective. The ecological requirements of the pines and larch, the increasing markets for smaller material and the necessity of removing large amounts of diseased timber, all indicate that even-aged management should be applied.

Sidel also suggests the selection system could be used in disease-free stands if stand structure and composition are suitable and the conversion to more shade-tolerant species is not objectionable.

In the northwestern ponderosa pine and associated type, Barrett (1979) states that both methods (even and uneven-aged) can be used successfully but that mature trees have been shown to exert a significant effect on smaller understory trees in both height and diameter growth.

Barrett (USDA, 1973) also recommends that clearcutting or shelterwood methods be used on stands infested with dwarf-mistletoe.

In the lodgepole type, Alexander, et al, (USDA, 1983) recommended clearcutting as the most practical method of harvesting because of windthrow and disease problems associated with other cutting methods.

Based on Regional direction (USDA, 1984) the following criteria will be used in selecting the appropriate silvicultural system:

- The selected harvest cutting method must permit the production of volume of marketable trees sufficient to utilize all trees that meet utilization standards and are designated for harvest.

- The selected silvicultural system must permit the use of an available and acceptable logging method that has the capability to remove logs and other products without excessive damage to the identified desirable residual vegetation.

- The selected silvicultural system must be capable of providing special conditions such as a continuous canopy or continuous high density live root mats when required by critical soil conditions or needed to achieve management objectives such as streamside protection, wildlife needs, and visual enhancement.

- The selected harvest cutting method must permit control of vegetation to establish desired numbers and rates of growth of trees, as well as vegetation needed to achieve other management objectives identified in site-specific silvicultural prescriptions.

- The harvest cutting method selected will promote a stand structure and species composition that minimizes serious risk of damage caused by mammals, insects, disease, or wildfire, and it will allow treatment of existing insect, disease, or fuel conditions.

- The harvest cutting method selected must meet resource and vegetation management objectives identified in the Regional Guide and Forest Plans. Harvest cutting methods to be used on specific areas may be identified in Forest Plans, in environmental assessments, or in silvicultural prescriptions that are written or reviewed by a certified silviculturist.

Additional supporting rationale for these criteria are found in the Regional Guide.

When the foregoing factors are considered, the area likely to be judged suitable for intensive uneven-age management is believed to be relatively small. Conversion of uneven-aged stands to an even-aged structure may be expected where the resource management goal is sustained timber yields at high levels. Uneven-age management may be applicable where continued sustained yield at high levels is not critical to overall resource goals.

4. Standards for Dispersing Even-Aged Harvest Units

Within Management Area 1, regeneration harvest units will be separated by uncut stands containing one or more logical logging units. Regeneration harvest of units adjacent to an existing regenerated unit will not be initiated until 80 percent of the desired crop tree stocking of the existing unit reaches 4 1/2 feet in height. At this height a stand is established silviculturally, visually, and as cover for some wildlife species, but does not provide sufficient age or height differentials over time to enhance either wildlife or aesthetic diversity in terms of edge contrast. Small trees would not be expected to provide sufficient edge contrast to allow for shaping and blending of harvest units to the extent practicable. Further delay in harvest of adjacent mature stands, however, increases chance of dwarfmistletoe infestation or other disease or insects invading the regenerated stands.

Within Management Areas 2 and 3, regeneration harvest units will be separated by uncut stands containing one or more logical logging units. Regeneration harvest of units adjacent to an existing unit will not be initiated until 80 percent of the desired crop tree stocking of the existing unit reaches 10 feet in height.

This exceeds silvicultural standards for stand establishment, provides sufficient age and height differentials over time to maintain edge contrast (enhancing wildlife and aesthetic diversity), and maintains the unique identities of adjacent stands. This height provides a well-defined edge so that units can be shaped and blended to the extent practicable, and hiding cover that is usually sufficient to meet definitions found in Wildlife Habitat in Managed Forests (Thomas, et al, 1979).

5. Predicting Timber Yields

Managed yield tables for Forest planning are based on the need for yield projections for a variety of management intensities within the Forest model.

a. The Forest model developed in 1980 identified the following three working groups:

   - CD - Lower elevation timber types of primarily ponderosa pine and Douglas-fir associated with climax pine and Douglas-fir plant communities (Hall, 1973).

   - CW - Mid to higher elevation timber types of Douglas-fir, ponderosa pine, true firs, western larch and Engelmann spruce associated with mixed conifer and true fir plant communities.

   - LP - Lodgepole pine timber types and plant communities.

   The working groups were developed to represent a ranking of relative biological yield with the CD group producing the lower yield and the CW group the higher yield.

b. The Growth Prognosis System (Stage, 1973) was selected to produce yield projections based on work done by Collard (1981) and Wood (1979). This system was also the only readily available program to Forest planners that could produce alternatives. The Inland Empire Version was selected for use since this was the most up-to-date (Wykoff and others, 1981).

c. The Forest planning team identified the need for the following investment levels for each working group for even-aged stands. An investment level is based on specified combinations of silvicultural activities:

- Harvest and reforest (artificial or natural) only. No intermediate cultural activities.

- Harvest, reforest (artificial or natural) and precommercially thin.

- Harvest, reforest (artificial or natural), precommercially thin with one or more commercial thinnings.

- Harvest, artificially reforest, commercial thin without precommercial thinning.

d. A data set was developed for each working group for use in PROGNOSIS starting with bare ground for even-aged stands and a specified diameter distribution for uneven-aged stands. Stand attributes were developed from local Forest data and recent research publications on growth and yield.

CD working group sample plot was developed using Forest stand examination data from Baker and Wallowa Valley Ranger Districts and Barrett (1978 and 1979).

Sample plot data of the CW group was developed from Wallowa Valley, Pine and Union Ranger Districts' stand examinations and Cochran (1979 A).

LP group plot data came from stand examinations on Baker Ranger District and Dahms (1964).

Uneven-aged data was developed from Forest inventory data for the multi-treatment model and Collard (1981).

e. PROGNOSIS was used to project yields for each working group and silvicultural activity.

Elevation (mean) and aspect (mode) were calculated from Forest inventory data by working group (Table B-2). Slope, as determined by the planning team, averaged 15 percent for tractor yarding ground and 50 percent for nontractor ground. PROGNOSIS projections at 15 percent and 50 per- cent slope were compared and we found very little dif- ference between the two. Therefore, 15 percent slope was used for both tractor and aerial yarding yield pro- jections. Forest 17 (Nezperce) was used since it is the nearest to the Wallowa-Whitman (Wykoff and others, 1981).

A list of possible plant communities for each working group was developed and a test run made with each type for one growth cycle. The initial scale factors were compared and the habitat type with a scale factor closest to 1 was selected for production runs.

f. Diameter growth increment was calibrated to the sample plot data and height growth increment was calibrated to duplicate height growth for ponderosa pine per Barrett (1978), and Douglas-fir and white fir per Cochran (1979 B and C). Average height and increment for uneven-aged areas were reduced to reflect small tree suppression per Myers (1934) and Knapp (1974). A maximum basal area was set for each working group based on the mean of 30 percent of the highest basal areas from uncut plots. Recent mortality was added back into the lodgepole pine working group plot data to account for mountain pine beetle epidemic.

g. Test runs for even-aged projections were made for each working group using a variety of treatments consisting of no commercial thinning and one, two and three commercial thinnings both from above and from below.

h. Test runs were compared and those projections that produced the highest cubic foot mean annual increment were selected as the managed yield for the designated working group and investment level. Table B-3 summarizes these yields.

i. A test of the even-aged prognosis yields was made by comparing them to standard yield tables. The precommercial thinning only tables were used in this comparison. Table B-4 displays the results of the comparisons.

j. The rationale for uneven-aged projections is essentially the same as developed by Collard (1981) except the Inland Empire Version was used instead of the Eastern Oregon Version.

   The Eastern Oregon model was not used because it is essentially an older version of a north Idaho model with some modifications by the Boise Cascade Corporation and does not have height increment calibration or a revised diameter limit thinning option that allows a percentage cut within a diameter class.

k. Previous decade mortality was added to merchantable cubic foot volume at each harvest entry to compensate for higher-than-experienced mortality (1 percent prognosis vs 0.5 percent inventory data) and to use recent mortality at harvest.

l. Final yield tables reflect 100 percent stocking. Gross cubic foot volumes reflect a minimum merchantability standard of 7 inches DBH and a 4 inch top DIB. Gross board-foot volumes have a minimum standard of 9 inches DBH and a 6-inch top DIB.

m. Net volumes were developed using the following adjustment factors:

REDUCTIONS DUE TO OPERATIONAL FALLDOWN
(Percent)

Working Group	Misc.1/	Nonstockable Area 2/	Defect & Breakage 3/	Final Harvest Total	NR-CT NR-CT Total 4/
CP	3.0	3.0	1.0	7.0	12.0
CW	3.0	2.0	2.0	7.0	12.0
LP	-	1.0	-	1.0	1.0

1/ Nonstocked holes and replant lag
2/ 1979 National Forest Inventory (NFI) data extract
3/ Assumption
4/ Additional 5 percent reduction for nonstocked areas (nonlodgepole stands only) at first commercial thinning in naturally regenerated harvest units.

n. Ten percent genetic gain used at all harvest entries on even-aged CD and CW working groups scheduled for planting.

o. Final removal and regeneration lag assumptions:

Time span between seed cut of a shelterwood and the final harvest are expected to be:

	CD	CW	Lodgepole Pine
Planted	10 yr.	10 yr.	Not Applicable
Natural	20 yr.	20 yr.	Not Applicable

The following regeneration lag times (years between regeneration harvest and adequate reforestation) are assumed:

Regeneration Method	CD	CW	Lodgepole Pine
Planting	5 yr.	5 yr.	Not Applicable
Natural	10 yr.	20 yr.	5 yr.

Table B-2
NFI DATA SUMMARY BY WORKING GROUPS FOR PROGNOSIS MODELING

No. Plots	Model	Component	Aspect3/	Slope 1/ Class	Elevl/	Site Index 2/ PP	DF	GF	WL	LP	ES	AF
23	CD-REG1	0101	4.1=SE	3.1=27%	4600	76	72					
81	CW-REG1	0102	3.8=SE	2.8=24%	5200	78	75	43	58		61	75
45	LP-REG1	0103	3.8=SE	1.7=13%	5500			38	50	40		63
33	CD-REG2	0201	4.8=S	3.1=27%	4600	59	62		50			
31	CW-REG2	0202	3.9=SE	2.7=23%	5100	64	63	35	50	43		73
37	CD-CT	0301	3.5=SE	2.9=25%	4400	69	70					
31	CW-CT	0302	3.8=SE	2.9=25%	5000	63	71	40	55	20	40	60
20	CD-FO	0401	3.4=E	4.1=37%	4500	80	74					
34	CW-FO	0402	3.1=E	3.2=28%	5000	65	72	45	50		55	75
15	LP-FO	0403	3.2=E	1.4=10%	5000				60	36		
29	CD-OWR	0701	3.8=SE	2.3=19%	4800	68	66	50				
50	CW-OWR	0702	3.8=SE	2.5=21%	5100	74	68	35	50	43	45	80
40	CD-MT	0801	3.2=SE	2.5=21%	4500	70	67	40				
24	CW-MT	0802	4.4=SE	2.9=25%	5100	78	69	46			60	55
10	LP-MT	0803	3.4=E	1.5=11%	5100	80		35	55	40		

Average by working groups weighted by number of NFI plots:

No. Plots	Model	Component	Aspect3/	Slope 1/ Class	Elevl/	PP	DF	GF	WL	LP	ES	AF
						**						
182	CD		3.8=SE	3.0=26%	4600	70(75)	69(54)	45	50	-	-	-
251	CW		3.8=SE	2.8=24%	5100	70(80)	70(56)	41(48)	53	35	52	70
70	LP		3.5=SE	1.5=11%	5200	80	-	37	55	39(40)	-	63
All types			SE	20%	4970	73	70	41	53	37	52	67

1/ Mean values.

2/ Site indices calculated to the nearest foot for PP from Barrett, 1978; for DF from Cochran, 1979B; for WF from Cochran, 1979C; for LP from Dahms, 1964.

3/ The mode, or most frequently occurring value, was used for the aspect. These values are:

CD = 8 (west)
CW = 1 (north)
LP = 0 (flat)

Table B-3

SUMMARY OF CUBIC FOOT PRODUCTION AND SIZE FROM WALLOWA-WHITMAN NF YIELD TABLES

Yield Table	CMAI			95% CMAI			17" Mean DBH		
	Age	DBH	Vol.	Age	DBH	Vol.	Age	DBH	Vol.
CD-PCT	80	15.6	41.11	70	14.2	40.04	90	17.0	40.97
CD-PCT, CT at 60	90	18.9	42.74	80	17.4	42.18	80	17.4	42.18
CD-PCT, CT at 70	90	19.0	42.34	70	15.7	40.04	80	17.3	41.68
CW-PCT	90	13.8	53.37	70	11.5	51.30	120	17.2	49.46
CW-PCT, CT at 60	100	16.7	55.32	80	14.0	53.56	110	18.7	54.24
CW-PCT, CT at 70	100	16.8	56.22	90	15.5	55.84	110	18.1	55.25
LPP-PCT	60	11.7	47.05	50	10.2	43.88	-	-	-
LPP-PCT, CT at 50	70	15.1	49.17	60	13.4	47.93	-	-	-
LPP-PCT, CT at 60	70	15.0	48.14	60	13.4	47.05	-	-	-
CD-No PCT or CT	110	11.9	23.6	100	11.9	22.9	-	-	-
CD-No PCT,CT @80	100	6.5	24.5	100	6.4	23.9	-	-	-
CW-No PCT or CT	120	13.8	34.1	100	13.3	33.3	-	-	-
CW-No PCT,CT @80	120	7.5	34.3	110	7.3	32.8	-	-	-
CL-No PCT or CT	100	6.6	23.2	80	6.2	22.0	-	-	-

	Growth (CF/Yr)	Harvest (CF/Yr)
CD Selection, 16" tree	36.00	35.65
CD Selection, 20" tree	32.95	32.55
CD Selection, 30" tree	27.75	27.30
CW Selection, 16" tree	47.25	47.00
CW Selection, 20" tree	45.15	44.90
CW Selection, 30" tree	39.85	39.40

Table B-4
COMPARISON OF PROGNOSIS YIELDS WITH PUBLISHED YIELD TABLES

CP - Age 80 PROGNOSIS CMAI

Item	PROGNOSIS	1/ Myers (1961) & Cochran (1979A)
Basal Area	140	125
Height	66	65
Volume (cu.ft.)	3289	2739
Mean Annual Increment	41.11	34.24

LP Age 60 PROGNOSIS CMAI

Item	PROGNOSIS	Dahms (1964)
Basal Area	153	121
Height	47	47
Volume (cu.ft.)	2823	2112
Mean Annual Increment	47.05	35.20

CW Age 90 PROGNOSIS CMAI

Item	PROGNOSIS	2/ Myers (1961) & Cochran (1979 A)
Basal Area	175	201
Height	75	73
Volume (cu.ft.)	4803	4593
Mean Annual Increment	53.37	51.03

1/ 44% PP and 56% DF
2/ 20% PP, 30% DF and 50% WF

Species distribution by working group based on 1979 NFI data.

Proportion of PP volume from published yield tables based on Stand Density Index adjustment.

6. Predicting Sawtimber Mortality Salvage

All Forest Plan alternatives project salvaging a volume of saw- timber from dead trees. This is material which has died as the result of naturally occurring (endemic) levels of forest disease and pests, and which meets sawtimber standards at the time of harvest.

There is an estimated net annual mortality on the Forest of 74 MMBF. Much of this mortality is inaccessible due to its location or is otherwise uneconomical to salvage log. Those trees not salvaged will serve as replacement wildlife trees. Within the objectives of the selected alternative for the Forest Plan, an attempt will be made to capture as much of this annual mortality as is reasonably possible.

Two types of sawtimber mortality salvage occur on the Forest. The first type is salvage of sound, dead trees which occurs simultaneously with harvest of live trees on the same acres. The second type is harvest of mortality in separate sales which are designed specifically to capture dead material. The projected volume for each type of salvage is calculated separately and added together as a part of the roundwood volume displayed in the DEIS and the Forest Plan.

Calculation of mortality harvested during live tree sales is based on the timber inventory estimates of salvable dead material as a percent of total standing volume. At the time of the 1979 timber inventory there were 267 MMBF of salvable dead volume on the Forest and 10,246 MMBF of live standing volume (net). On this basis it is estimated that for each million board feet of live timber harvested, 26,100 board feet of dead material will also be harvested (on average, across the Forest). This ratio was applied to each alternative in estimating this component of mortality salvage.

The volume of mortality from salvage sales was estimated using the average volume per acre of salvable material (from the timber inventory statistics) multiplied by the number of acres projected to be accessed under the salvage sale program (10,700 acres per year). The timber inventory showed 267 MMBF of salvable volume on 1.159 million acres for an average volume of 230.8 board feet per acre. Based on this process, an estimated 2.5 MMBF of sawtimber is likely to be harvested. Since the numbers of acres accessed by salvage sales is primarily dependent upon funding available for this type of activity, the estimated volume was held constant for all alternatives.

The combined estimate of sawtimber mortality salvage from green sales and salvage sales varies from a low of 5.1 MMBF in Alternative F to a high of 7.2 MMBF in Alternative B-departure in the first decade.

7. Resource Yield Tables

The HERBGE (total annual herbage production) FORGTL and FORSTP (forage available on gentle and steep ground respectively) yield tables are derived using Hall's Community Types to provide esti- mated baseline outputs for the working groups. Data from Miller, McConnel and Smith, Wood, and Young (on file at Forest Head- quarters) provided estimates of herbage production after regeneration harvest or under a stand of given crown canopy closure. Safe use factors developed by the Umatilla National Forest allowed conversion of these herbage yields to AUM's on steep and gentle ground, using a value of 800 pounds per AUM.

HIDING cover yield tables project only future cover development. An unthinned stand is assumed to provide 100 percent hiding cover for one decade; a thinned stand 70 percent hiding cover for two decades. Both thinned and unthinned stands show complete loss of hiding cover over time.

THERML cover yield tables show approximately 90 percent thermal cover for existing mature stands. Future mature stands eventually provide 100 percent thermal cover on a schedule which relates basal area growth to crown canopy closure.

OLD GR yield tables are based on the proportion of existing stands that would qualify as old-growth, extrapolating on a gross schematic basis for proportions that may qualify as old-growth in the future. Several tables show old-growth values eventually going to zero. This was done solely to force selection of old-growth replacement, and was changed in several alternatives to allow permanent maintenance of old-growth stands.

SALVGE yield tables estimate the amount of salvable dead volume which might be available based on the following assumptions:

a. Mortality largely returned to 1968 inventory levels - tussock moth and mountain pine beetle no longer at the epidemic levels of 1978 inventory.

b. Relationship of salvable dead to mortality in various model components is the same as in the 1978 inventory.

IV. ECONOMIC EFFICIENCY ANALYSIS

This section describes the costs and benefits (as well as some concepts involved in economic efficiency analysis), how they were derived, and how they were used in the Forest Planning process. Economic efficiency analysis is required by the National Forest Management Act Regulations (36 CFR 219) and played an important role in the development and evaluation of Forest planning benchmarks and alternatives. Specifically, 36 CFR 219.12(f) states:

> "The primary goal in formulating alternatives, besides complying with NEPA procedures, is to provide an adequate basis for identifying the alternative that comes nearest to maximizing net public benefits."

Direction continues in 36 CFR 219.12(f)(8):

> "Each alternative shall represent to the extent practicable the most cost efficient combination of management prescriptions examined that can meet the objectives established in the alternative."

A. Descriptions of Some Concepts Related to Efficiency Analysis

Priced Outputs (Benefits)

Priced outputs are those that can be exchanged in the market place. Their quantitative values are determined by actual market transactions or by estimation methods that produce prices approximately those determined by market transactions. Timber, forage, and minerals are examples of commodities which are bought and sold in the market. Their values are determined through the interaction of buyers and sellers based on the supply and demand conditions in the market at the time of the transaction. Recreation visitor days (RVD's), on the other hand, are not normally exchanged via market transactions. Their market values are estimated by using some market transaction data in combination with various theoretical techniques. Conceptually, these assigned values should be consistent and comparable to those values which were actually derived via market transactions (Rosenthal and others, 1985). Therefore, both assigned and market values are appropriate for calculating quantitative measures of efficiency such as present net value. All benefits and costs are tracked in real terms, i.e., exclusive of inflationary effects.

Non-Priced Outputs

Non-priced outputs are those for which there is no available market transaction evidence and no reasonable basis for estimating a dollar value comparable to market values associated with the priced outputs. In these cases, subjective non-dollar values must be attributed. These values are therefore described qualitatively rather than quantitatively. They may be either positive or negative. In fact, what may be considered to be a benefit to one individual may represent a cost to someone else. Examples of nonpriced outputs include threatened and endangered species, natural and scientific areas, historical and anthropological sites, visual quality, and clean air.

Discounting

Analyses of alternative investment options usually involve cash flows over different periods of time. Due to a number of factors, including the uses to which it can be applied, a dollar received today is worth more than a dollar received ten years from now. Discounting is a process whereby the dollar values of costs and benefits which occur at different periods are adjusted to a common time period so that they can be compared. Usually the common time period is the present; in which case, the discounted value is referred to as a present value. The real discount rate used in National Forest planning is 4 percent. As a real discount rate, it is exclusive of the effects of inflations.

Present Net Value (PNV)

Present net value is the difference between the discounted value of all outputs or benefits to which monetary values or established prices are assigned and the total discounted costs of managing the planning area. The period of analysis used is 150 years which enables the model to reflect the changes that occur as the Forest is changed to a managed condition. Costs and benefits beyond that point are reduced to insignificance through discounting. The maximization of present net value was the criterion used to help assure that each alternative was the most economically efficient combination of outputs and activities to meet the objectives established for that alternative. Present net value calculations consider only the benefits and costs for which dollar values were assigned. On the Wallowa-Whitman, the priced benefits included timber, recreation, range, water, anadromous fish, and miscellaneous receipts. These were compared with all Forest Service fixed and variable costs associated with managing the planning area. Therefore, PNV is an estimate of the respective benchmark's or alternative's excess of benefits over its related costs.

Opportunity Costs

Opportunity costs are defined as the value of a resource's foregone net benefit in its most economically efficient alternative use (FSM 1970.5). In relation to the economic analysis performed for Forest Planning, it represents the decrease in PNV of an alternative or benchmark when some different level of resource outputs are forced into solution. Therefore, opportunity costs measure the net change in PNV for priced resource outputs and associated costs, and can be used to measure the net value sacrificed in order to produce the non-priced benefits included in net public benefits.

Net Public Benefits (NPB)

The maximization of net public benefits is the goal of the Forest planning process. Net public benefits is the overall value to the Nation of all outputs and positive effects (benefits) less all the associated Forest Service inputs and negative effects (costs) whether they can be quantitatively valued or not. Net public benefits cannot be expressed numerically because they include qualitatively-valued nonpriced outputs.

Conceptually, net public benefits is the sum of the present net value of priced outputs plus the net value of all non-priced outputs.

Welfare Distribution Effects and Impacts

There is another level of effects which are also a concern to management. These are the welfare distribution effects influenced by the mix and level of outputs produced by the National Forest. They can be either positive or negative. They can be local, regional, or National in scope. Some distributive effects such as changes in consumer prices or taxpayer costs have National level impacts. Others, such as induced jobs and income or payments to local governments, are more local or regional in nature. These concerns are more related to questions of equity (i.e., who pays and who benefits) rather than questions of efficiency. They are not assessed in the context of the efficiency criteria associated with PNV and net public benefits. However, these positive and negative distributive effects need to be assessed as part of the net public benefit measures since equity objectives often influence efficiency objectives and vice versa. These will be discussed in more detail in Section V.

Parameters and Assumptions Used For Economic Efficiency Analyses

In order to calculate the present net value for each alternative, assumptions had to be made regarding discount rates, demand functions, establishing a common reference point in time for dollar values, and real price and cost trends. This section summarizes these decisions and their resulting parameters. A more detailed discussion can be found in various process records in the Forest Supervisor's Office, Baker, Oregon

Discount Rates

Discounting involves the application of a discount rate that represents the time value of money in determining the present value of future costs and benefits. A 4 percent real discount rate was used to calculate the present net value for each benchmark and each alternative. As a real discount rate, it excludes the effects of inflation. This is not an assumption that there will be no inflation. It is rather an assumption that the costs and benefits presented in the analysis will generally increase or decrease at the same rate as the rate of inflation. According to FSM 1971.71:

> "For evaluations of long-term investments and operations in land and resource management in the 1980-1985 planning period, a 4 percent real discount rate shall be used. Evaluations should also discount benefits and costs at the real discount rate used in the most recent RPA to determine sensitivity of alternatives to variations in the discount rate."

The 4 percent rate approximates the "real" return on corporate long-range investments above the rate of inflation (Row and others, 1981). The 4 percent rate was used to solve FORPLAN and calculate the PNV for each benchmark and alternative. The 1985 RPA Program used a real discount rate of 7 1/8 percent. An analysis of the sensitivity of the Preferred Alternative to the discount rate will be performed by using the 7 1/8 percent discount rate as well. For all other benchmarks and alternatives, the present net values were merely recalculated using this second discount rate (FSM 1971.71). Finally, all costs and benefits were discounted from the midpoint of the decade in which they were incurred.

Demand Functions and Real Price Trends

As specified by the Washington Office, USDA Forest Service (1920 letter to Regional Forester, "Downward Sloping Demand Curves", 2/3/81) and in keeping with FSM 1971.65, horizontal demand functions for timber and nontimber resources were used to analyze the benchmarks and alternatives for the DEIS. Many factors can influence the demand for stumpage from any one Forest (Row and others, 1981). Some of these factors include trends in interest rates, the species and product mix, the use of wood for energy, forest products exports, the cost of Canadian lumber, the rate of technical improvement in wood processing, and the levels of harvests on other National Forests. Also to be considered are the full range of wood product substitutes and the full range of considerations dealing with their respective, complementary goods and practices. All these contain some degree of uncertainty. Neither the empirical nor the theoretical bases have been well enough developed to derive reasonable estimates of the demand functions for the resources offered at the Forest level. Evidence suggests that the elasticity in the portion of the timber demand curve for which the Forest can influence output levels is such that prices would be relatively insensitive to some "reasonable" range of Forest timber offerings. In other words, it appears that the timber demand curve for the range of ouput levels analyzed during the development of alternatives is best depicted by a horizontal demand function. We assume that prices are insensitive to volumes offered.

Real price trends were developed and used to represent the rate at which resource values will change over time as a result of anticipated supply and demand interactions in the market place. As specified by the Regional Office (1920 letter to Forest Supervisors, "Timber Price Trends, Values, and Costs", 9/25/84), a 1 percent per year increasing real price trend for stumpage was used for FORPLAN harvest scheduling analyses. This was applied for the first 50 years. No further change in the price trend was assumed for the remaining 100 years of the planning horizon. Nominal stumpage prices (i.e., those which include the effects of inflation) are therefore increased during the next 50 years at a rate of 1 percent greater than the rate of inflation. Thereafter they are assumed to change at a rate equal to the rate of inflation.

Since price trends are reflections of conditions expected in the future, there is an inherent uncertainty involved in making any such projections. In recognition of this uncertainty, we performed a sensitivity analysis using alternative stumpage price changes of 0, 2, and 3 percent, compounded annually. The results of these runs are quite complex and are discussed in detail in the Forest working papers. Generally, the model showed itself to be insensitive to the 0, 1, or 2 percent real price increase in terms of acreage dedicated to timber management. In each of those cases, 997,000 acres were so dedicated. At a real price change of 3 percent, the figure increased to 1,033,000 acres.

Based on Washington Office direction, constant real prices were assumed for all other resources.

Real Cost Trends

Based on Washington Office direction, constant real costs were assumed. That is, the costs of labor, fuels, materials, and all other factors of production involved with managing the Forest are assumed to change at a rate equal to the rate of inflation. Sensitivity tests were conducted to see how the model reacted to a 50 percent reduction in reforestation costs and a 20 percent reduction in timber sale related costs. In both cases, the model maintained its original selection of 997,000 acres for timber management.

Real Dollar Adjustments

All costs and values used in the Forest planning process are expressed in 1982 dollars, consistent with the 1985 RPA program. The GNP Implicit Price Deflator was used to convert both historical and future nominal prices and costs to this common base (FSM 1971.32b).

B. Costs Used for Economic Efficiency Analysis

This section describes the costs used to perform economic efficiency analysis for each of the benchmarks and alternatives considered during the development of the DEIS.

All Forest Service costs were included for purposes of estimating budgets and calculating the present net value for each alternative. These costs were identified by their Management Information Handbook (MIH) codes as described in FSH 1309.11. The MIH activity descriptions and their associated codes were useful for identifying how different costs would be treated during the planning process. At the outset, each cost was categorized as either a fixed or a variable cost. If it was identified as a variable cost, decisions were made as to whether it would be analyzed in FORPLAN or INTEGER, an electronic spreadsheet. Costs were determined by examining the Forest Unit Summary Reports and other historical records, and by constructing cost estimates. Professional judgement was also an important factor when it came to making assumptions regarding what bearing historical costs had on anticipated future costs. All costs were developed and reviewed by the Forest Economist and the appropriate staff and substaff personnel. The following discussion summarizes the costs and how they were incorporated into the efficiency analysis for each alternative. A more detailed presentation of the specific costs and their functions in the analytical tools can be found in the process records at the Forest Supervisor's Office, Baker, Oregon.

Fixed Costs

A cost was classified as being "fixed" if it was not expected to vary significantly over the range of alternatives considered. Fixed costs were a component of the budget estimates and present net value calculations for each alternative.

Table B-5 lists the MIH codes and their associated activities that were considered to be "fixed" across all alternatives developed for the DEIS. These costs also do not vary over time.

Variable Costs

All other costs are classified as being "variable". For instance, the Forest has the ability to invest more or less money in precommercial thinning, depending on the desired level of timber production. (This includes those costs which are more properly identified as being semivariable in recognition that a certain portion of their total is fixed.) These costs were tied to the implementation of activities and are expressed as costs per acre or costs per unit of output (e.g., dollars per MCF, dollars per RVD). Variable costs are analyzed, insofar as they relate to the timber program, in FORPLAN.

INTEGER, an electronic spreadsheet representing all quantified Forest costs and benefits, was run on an Apple III to generate final figures for presentation. The use of this model name is for purposes of clarity. Such use does not constitute an offical endorsement or approval of any service or product by the USDA Forest Service, to the exclusion of others that may be suitable.

Table B-5
FIXED COSTS

MIH Code	MIH Activity Description	Average Annual Expenditure 1982 M$ 1980-1983
C01	Fish and Wildlife Planning	126
C02	Habitat Improvement T&E Animals	3
C03	Habitat Improvement T&E Plants	9
C06	Habitat Maintenance	21
C07	Structural Fish Habitat Improvement	10
C09	Wildlife Habitat Maintenance	3
C12	T&E Species Act Coordination (S&P)	1
C15	Habitat Access Controlled by Closures	-0-
F04	Water Uses Management	22
F06	Water Resource Improvement Maintenance	1
F10	Cooperative Technical Assistance, Water (S&P)	-0-
G02	Minerals Management - Oil and Gas	1
G09	Mined Area Reclamation	1
J03	Federal Energy Regulatory Commission License and Permits	2
J11	Land Adjustment Planning	2
J13	Land Exchange	58
J14	Land Exchange - Cash Equalization	3
J15	Land Acquisition	58
J20	Geometronics	4
J22	Forest Land and Resource Planning	216
K06	Soil Resource Improvement Maintenance	-0-
P15	Vegetation Treated by Burning	7
P24	Law Enforcement	51
P25	Cooperative Law Enforcement	7
P26	Search and Rescue	-0-
P32	Forest Fire Presuppression-(S&P)	11
P34	Insect & Disease Management - Surveys and Technical Assistance (S&P)	6
P35	Insect & Disease Management - Suppression (S&P)	9
P40	Insect and Disease Management - Special Projects (S&PF)	14
T01	Line Management (FSH 1309.11a)	625
Total Fixed Costs		1,271

Percentage of Recent Average Total Budget: 5.5

In general, FORPLAN contained all of the costs and benefits associated with the timber program, including the costs of accessing previously unroaded areas. The model reflected differences in logging costs between tractor logging, shortspan cable logging (less than 2000'), and helicopter-longspan cable logging. The Tables B-6 and B-7 depict the Forest Service costs that were included in FORPLAN and which contributed to its calculation of PNV for alternative multiple use timber harvest scheduling solutions.

Table B-6
COSTS TRACKED IN FORPLAN IN THEIR ENTIRETY*

MIH Code	MIH Activity Description	1982-M$ 1980-1983 Average Annual
E00	Timber Resource Management Planning Inventories	74
E03	Silvicultural Examination and Prescription	540
E04	Reforestation	1645
E05	Timber Stand Improvement	627
E06	Timber Sale Preparation	1484
E07	Timber Harvest Administration	792
E08	Nursery Management	6
E09	Genetic Forest Tree Improvement Program	50
L14	Timber Purchaser Road Construction	1473
L29	Timber Purchaser Road Reconstruction	2091
P11	Treatment of Activity Fuels	326
	Total Average Annual	9108
Percentage of Recent Average Total Budget:		39.4

*FORPLAN was also afforded the opportunity to access the Forest's remaining roadless areas for the cost of their access road construction.

Table B-7
COSTS ATTRIBUTED IN PART TO THE TIMBER PROGRAM AND TRACKED IN FORPLAN

MIH Code	MIH Activity Description	Percentage Charged Timber	Annual Expenditures 1982 M$
A02-A06	Cultural Resource Inventories	90	140
F01	Water Resource Planning	80	71
F02	Water Resource Inventory	80	15
F03	Water Resource Monitoring	80	14
G01	Mining Law Compliance and Administration	20	20
G07	Minerals Management-Mineral Materials	20	2
G11	Geological Planning and Inventory	100	11
J01	Special Use Management (Non-Recreation)	10	8
J06	Property Boundary Location	90	269
J07	Property Boundary and Corner Maintenance	90	1
J18	Rights-of-Way Acquisition	70	6
K01	Soil Resource Inventory	80	6
K03	Soil Resource Planning	80	14
K04	Soil Monitoring	80	8
---	Engineering Services	91	1469
---	Road Maintenance (Other than Co-op)	53	466
---	Capital Improvements	95	760
---	Facility Maintenance	24	58
---	Facility Construction/Reconstruction	24	19
P01	Fire Management Planning and Analysis	50	76
P02	Fire Prevention	50	63
P03	Fire Detection	20	17
P04	Primary-Initial Attack Forces	50	409
P06	Fire Reinforcements	20	10
P07	Forest Fire Support and Facilitating Services	50	32
P08	Initial Attack Fire Suppression Action	50	380
P14	Fuel Treatment Area Maintenance	50	1
P19	Aerial Transportation of Personnel	20	101
P21	Aerial Application of Materials	20	24
	Total		4,470
	Percentage of Recent Average Total Budget		19.4

The above tables list the MIH activity codes for which costs were developed and entered into FORPLAN. Since Version I of FORPLAN does not easily track its activities by individual MIH codes, many of these elements were combined into broader FORPLAN cost categories. These costs were expressed in terms of dollars per acre or dollars per MCF. For each FORPLAN cost category, a range of costs was entered into the model based on the Management Prescriptions, and the characteristics of the analysis areas to which they applied. All in all, 239 different FORPLAN economic tables were developed to cover the different cost and value combinations to which prescriptions could be assigned in the model. Table B-8 presents some broad FORPLAN cost categories, and the range of costs included in the Model.

Table B-8 1/
FORPLAN GENERAL INPUT COST DATA

FORPLAN Cost Category	Cost Range Per Acre
Reforestation 2/	0 - $409
Precommercial Thinning	$52 - $209
First Entry Road Construction	$56 - $268
Latter Entry Road Reconstruction 3/	0 - $134

1/ All costs vary depending on site-specific considerations such as steepness, species grouping, accessibility, stand characteristics, and the like.
2/ The lower figure represents conditions in which a protracted regeneration lag (well in excess of 5 years) is expected. The higher figure and other figures within the range reflect a mix of reforestation practices. The figures shown are exclusive of the extra costs associated with high elevation regeneration difficulty and shrubfield competition which range from $30 to $79 per acre.
3/ Overwood removals following regeneration harvests assume no additional road work.

All costs and benefits, whether identified in FORPLAN or not, are tracked outside the FORPLAN model. This provided a capsulized view of the Forest under different alternatives and enabled the analysts to fine-tune budget estimates.

In the case of recreation, including wilderness recreation, forecasts were made of future recreational activity on the Forest. These forecasts relied on the population projection contained in the 1980 OBERS BEA Regional Projections, Vol. 1, U. S. Government Printing Office, p. 117. OBERS is an acronym for the joint effort of the Office of Business Economics (OBE), now the Bureau of Economic Analysis (BEA), U. S. Department of Commerce; and the Economic Research Service (ERS) of the U. S. Department of Agriculture. These projections of use were in turn used to project associated costs.

Range program costs are a function of the number of AUM's respective to individual alternatives. Each grazing allotment on the Forest was reviewed by cognizant field personnel to determine what levels of investment were needed to accommodate different levels of AUM's. These alternative investment levels were then incorporated in the different alternatives based on the issues identified in them.

Costs associated with improving habitat for anadromous fish and wildlife were varied among the alternatives pursuant to the respective alternative's responses to issues, concerns, and opportunities (ICOs). As with range investments, these were constructed cost estimates. The same procedure was followed for watershed improvement work.

Costs for the minerals program and the human resources program were based on RPA projections of activities over the planning horizons. Facilities program costs not classified elsewhere, may be fixed or variable. Some reflect a fixed cost component of a semivariable cost.* Some are reflected indirectly in the FORPLAN model as in the case of co-op road maintenance which manifests itself in the form of lower stumpage values.

Program support and common services are recognized as being largely fixed but with a significant portion which will vary based on overall Forest activity, such as utility expenses.

C. Benefits Considered in Economic Efficiency Analysis

This section describes the benefits which were incorporated in the economic efficiency analyses for each benchmark and alternative considered during the development of the DEIS.

Resource outputs to which dollar values were assigned constitute the benefits included in the present net value calculations. Like the costs included in the analyses, only those benefits incurred during the 150-year planning horizon were incorporated in the PNV calculations. This period of analysis is more than adequate to capture all significant residual costs and benefits.

1. Benefits Whose Values are Determined in the Marketplace

Benefits fall into one of two categories: market or nonmarket (assigned). Market values constitute the unit price of an output normally exchanged in a market after at least one stage of production, and are expressed in terms of what people are willing to pay--as evidenced by market transactions. Nonmarket values constitute the unit price of an output not normally exchanged in a market at any stage before consumption, and thus one whose value must be assigned from other information (FSM 1970.5). They are valued in terms of what a reasonable and prudent individual would be willing to pay (above participation costs) rather than to go without. In either case, their values are theoretically commensurate and appropriate for inclusion in PNV calculations. The resources for which dollar values were estimated on the Wallowa-Whitman were timber, range, recreation, water, anadromous fish, and miscellaneous collections.

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*A semivariable cost is a cost which contains both a fixed component and a variable component.

Timber was the only resource whose benefits and costs were tracked in FORPLAN. These values were expressed in terms of dollars per MCF paid at time of harvest. The stumpage values were developed for both existing stands and future managed stands, and were stand-respective to the extent shown in Table B-9.

Table B-9
CHARACTERISTICS AFFECTING STUMPAGE VALUE DIFFERENTIALS ON EXISTING STANDS

CD: Ponderosa pine, Douglas-fir dominant

- Regeneration Harvest Opportunity
- Commercial Thin Opportunity
- Fiber Opportunity
- Overwood Removal Opportunity

CW: Mixed conifer

- Regeneration Harvest Opportunity
- Commercial Thin Opportunity
- Overwood Removal Opportunity
- Multitreatment Opportunity

High Elevation CW:

- Regeneration Harvest Opportunity
- Commercial Thin Opportunity
- Overwood Removal Opportunity
- Multitreatment Opportunity

CL: Lodgepole

- Regeneration Harvest
- Fiber Opportunity

Further differentiation of these values was based on the degree of accessibility (whether the stand was in the HCNRA or not), how the material was harvested (commercial thin, clearcut, shelterwood, e.g.), and the logging system.

Characteristics affecting stumpage value differentials for regenerated stands, besides species grouping, included the regeneration mode (which itself affected species mix); whether the stand was precommercially thinned or not (which affected board-foot volume production); whether the stand was commercially thinned, clearcut, shelterwood harvested, and so on. Harvest characteristics such as trees per acre, volume per tree, volume per log, tree height, slash treatment were also considered.

Since the source data was expressed in terms of dollars per MBF, it was necessary to convert these to dollars per MCF, the unit of measure used in FORPLAN. Stumpage values used in the planning process came from the Regional Office direction package of April 27, 1984 which contains estimates of high bid stumpage values at harvest. The stumpage value for each individual species was converted to working group stumpage values based on the species composition of each working group modeled in FORPLAN. These values represented the values of the empiric or existing stands. For regenerated or successor stands, estimates were made of stumpage values based on stand characteristics such as tree volume, tree height, trees per acre, species mix, and so on. These calculations were made for the yield table options put into FORPLAN and showed considerable change as the stands developed over time. These stand characteristics, along with those engendered by the anticipated logging system, were reflected in FORPLAN.

The range outputs represent the amounts of forage to be grazed by domestic livestock and is measured in animal unit months (AUMs). AUM values represent permittee willingness-to-pay for grazing on the Wallowa-Whitman. The Forest Service entered into a cooperative agreement with the USDA Economic Research Service to develop livestock enterprise budgets for each National Forest. The Range Budget Approach was used for this analysis. Because Forest AUMs are not actually priced in a free competitive market, the calculated price is an estimate of market value. The Regional Office Direction Package of April 27, 1984 stipulates a value of $7.47 per AUM.

The non-wildlife related recreation and wilderness outputs represent the amounts of their use on the Forest and are measured in terms of Recreation Visitor Days (RVD's). The wildlife related recreation use is measured in terms of Wildlife and Fish User Days (WFUD's). The values used for these priced outputs were derived directly from the 1985 RPA Program assessment. This discussion is a summary of the description found in Appendix F of the 1985 RPA DEIS.

The development of recreation, wilderness, and wildlife values for the 1985 RPA Program analysis was by activity per RVD or WFUD with adjustment of values to reflect standard and less-than-standard levels of management.

The Resource Evaluation Group at the Rocky Mountain Forest and Range Experiment Station conducted an extensive literature search to develop the 1985 activity values for recreation (Loomis and others, 1982). Benefit values for recreation, wilderness, and wildlife activities were developed from recent travel cost models and contingent valuation research (Loomis and others, 1982). In-service and academic specialists reviewed the research and the activity values and adjusted them to achieve the methodological consistency necessary to apply them to regional conditions. The values represent average willingness to pay. The RVD values by recreation activity that were generated by this study can be found in Table F.4 of the 1985 RPA DEIS.

In response to the question of quality, the concept of standard and less-than-standard service was introduced, and the resulting impact on the value of the experience to the recreationist was estimated. If recreation facilities are not fully maintained, the quality of the experience will be lowered. Two different sets of values were developed to account for standard and less-than-standard conditions. A special study showed that, on the average, the less-than-standard RVDs are valued at about 53 percent of the value of standard RVDs.

Finally, these values were expressed in terms of the Recreation Opportunity Spectrum (ROS) activity categories. The values are depicted in Table B-10.

Values used for maintained water quality ($200 per thousand acre feet), improved water quality ($1400 per thousand acre feet), and anadromous fish ($1,050 per thousand pounds) were among those stipulated in the Regional Office direction package April 27, 1984.

Miscellaneous receipts were also included as benefits for the calculation of PNV. The receipts for these activities were based on the actual receipts for fiscal years 1980 through 1983. These receipts are a very small percentage of total Forest revenues. They include monies received for the use of such Forest outputs as common variety mineral materials, admission and user fees, and land use.

2. Consideration of Nonquantified Costs and Benefits

The calculation of PNV provides efficiency data to use when comparing alternatives' output levels. However, other factors also influence the decisionmaking process. In some cases the importance of nonpriced benefits for which it is unrealistic to assign monetary values, can outweigh the advantages of producing higher levels of priced outputs. The importance of the need to consider these subjectively-valued benefits in Forest management decisionmaking is addressed in the NFMA Regulations which charge the Forest Service with identifying the alternative which comes nearest to maximizing net public benefits (36 CFR 219.12(F)).

Table B-10
1985 RPA RECREATION BENEFIT VALUES (1982 $)
(Average Willingness to Pay)

Recreation	Value ($/RVD)
Primitive (STD) 1/	11.25
Primitive (LSTD)2/	5.96
SemiPrimitive NonMotorized (STD)	13.25
SemiPrimitive NonMotorized (LSTD)	7.02
SemiPrimitive Motorized (STD)	12.13
SemiPrimitive Motorized (LSTD)	6.43
Roaded Natural (STD)	9.38
Roaded Natural (LSTD)	4.97
Rural (STD)	8.47
Rural (LSTD)	4.49
Urban (STD)	11.38
Urban (LSTD)	6.03

Wilderness	Value ($/RVD)
Primitive (STD)	17.50
Primitive (LSTD)	9.28
SemiPrimitive NonMotorized (LSTD)	9.28

Wildlife & Fish	Value ($/WFUD)
Big Game	30.00
Nongame	25.00
Resident Fish	15.00
Other Game	19.00
Wildlife and Fish Recreation (STD)	21.00
Wildlife and Fish Recreation (LSTD)	14.00

1/ STD Standard
2/ LSTD Less Than Standard

Net public benefits (NPB) represent the overall value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs), whether they can be quantitatively valued or not (36 CFR 219.3). Net public benefits include both priced and nonpriced resource outputs, less all costs associated with managing the area. As stated earlier, all priced outputs and costs associated with managing the Forest are included in the calculation of PNV. To this, the net subjective values of the nonpriced outputs must be included in order to arrive at the overall NPB of an alternative. Some of the more important nonpriced benefits addressed during the planning process included the following:

- Local Community Stability
    - Diversity and Quality of Recreation Opportunities
- Habitat for Threatened, Endangered, and Sensitive Species
- Minimum Management Requirements
- Ecosystem Diversity - Old-growth
- Landscape Appearance
- Accessibility by Roads

These are outputs and effects which are influenced by Forest management. They are all related to one or more issues and concerns which were identified at the outset of the planning process. Important as they are, it is not practicable to measure their importance in dollar terms comparable to market values. The values are determined subjectively.

Many of the nonpriced benefits are accommodated by applying constraints to the production of priced outputs (i.e., limiting the timber harvest in FORPLAN so that massive blocks of contiguous lands are not all harvested at the same time). These constraints usually result in a decrease in the PNV of the priced outputs to which the constraints are applied. Subjective judgements are then necessary in assessing whether the benefits of producing the nonpriced outputs exceed the opportunity costs associated with producing fewer priced outputs. If a PNV tradeoff induced by the provision of a nonpriced output is judged acceptable, then a positive contribution to NPB has resulted, and the alternative is determined to be more desirable overall.

The nonpriced outputs considered during the development and evaluation of alternatives are discussed below. While the quantitative dollar values of each are not determined, they can generally be evaluated by examining such quantitative indicators as acres of appropriate allocations, resource inventories, or timber production-related activities and outputs.

a. Local Community Stability. The residents of Baker, Union, and Wallowa Counties are especially dependent on the Wallowa-Whitman National Forest. The Forest is responsible directly and indirectly for thousands of area jobs, tens of millions of dollars of personal income, and sizeable contributions through the "25% Fund" to local road and school programs. The Forest's importance to the local communities in this regard is based primarily on its timber program which provides about half of the timber processed locally. The range program, while vitally important to some permittees, is much less important in terms of overall forage consumed locally by livestock (less than 8 percent). Recreation opportunities on the Forest abound and support an industry which is still developing.

b. Diversity and Quality of Recreation Opportunities. The number of recreation visitor days (RVD's) and their associated priced values are included in the PNV calculations for each alternative. However, the assigned dollar values per RVD by ROS category do not reflect the value of providing a diversity of recreation opportunities and settings. The Forest currently provides adequate recreation diversity as reflected in RVD capacity by ROS category. However, some aspects of the recreation opportunity spectrum are becoming more difficult to retain. For example, as remaining roadless areas are either designated as wilderness, or are roaded and developed for other uses, there are fewer opportunities for the semiprimitive and primitive recreation experiences outside the wilderness areas. Related to this is the idea that as more and more roadless areas are either developed or designated as wilderness, future generations will have fewer options regarding their management to meet changing needs. To the extent that retaining roadless areas in undeveloped condition does not restrict the efficient production of priced outputs, both recreation diversity and the future options they offer are considered a nonpriced benefit. For each alternative, the recreation allocations and projected carrying capacities are categorized according to the recreation opportunity spectrum. This will be used to assess the recreation diversity which an alternative provides.

c. Habitat for Threatened, Endangered, and Sensitive Species. The Endangered Species Act of 1973 (P. L. 93-205), as amended, declared that Federal agencies shall seek to conserve endangered and threatened species of plants and animals. In order to meet the intent of this direction the Forest Service has established objectives and policies for inventorying the species, determining habitat or environmental needs, and protecting critical habitat and/or conditions necessary to preserve the plants or animals (FSM 2670). Included is direction to protect certain sensitive species to ensure that they do not become threatened or endangered. The U. S. Fish and Wildlife Service, USDI, has primary responsibility for administering the Endangered Species Act. When the Forest Service proposes an activity that may affect a species listed, or proposed for listing as threatened or endangered, the Fish and Wildlife Service is consulted. The threatened, endangered, and sensitive species on the Wallowa-Whitman are listed in Table B-11.

d. Minimum Management Requirements. Each alternative provides for at least enough habitat to "maintain viable populations of existing native vertebrate wildlife species" (36 CFR 219.27 (a)(6)). However, some alternatives provide habitat for these species in excess of the MMR's. Any provision of suitable habitat in excess of the MMR's is considered to be a nonpriced benefit.

e. Ecosystem Diversity-Old Growth. Maintaining plant and animal ecosystem diversity over time is also considered to be a nonpriced component of net public benefits. Benefits generally associated with ecosystem diversity are gene pool maintenance, scientific research opportunities, and the reduction of insect and disease risks. Since animal diversity is to a large extent dependent upon plant diversity, attention is focused particularly on the number of acres of each working group in each successional stage. The amount of old-growth provided is especially important since this component is the most difficult to replace once it disappears. It serves as the focus for evaluating each alternative's impact on ecosystem diversity. Timber harvesting and fire are the chief means of manipulating vegetative diversity. To an extent, the more old-growth in a particular alternative, the higher its nonpriced benefits.

f. Old-Growth Timber. During the past dozen years there has been a growing interest in old-growth timber, apparently brought about by an awareness that unaltered old-growth stands are diminishing both in size and in number. One reason frequently given for retaining old-growth timber is to meet wildlife needs but the desire apparently goes beyond this. On the Wallowa-Whitman National Forest there is no wildlife species that has been identified as requiring solely old-growth timber conditions, although some species require conditions that are best represented in old-growth stands. People also want old-growth for the recreational enjoyment it provides, for aesthetic and other qualities such as the size and age of its trees. Those opposed to the retention of old-growth conditions cite their concern for the loss of wood production and often prefer that land be converted to rapidly growing timber stands. These conflicting desires are the basis of the old-growth issue. (For further discussion of the issue, see the Regional Guide.)

Table B-11
THREATENED, ENDANGERED, AND SENSITIVE SPECIES

Animals

List	Species	Status
Endangered	Peregrine Falcon	Several areas on the Forest exist where sightings have occurred.
Threatened	Northern Bald Eagle	Significant wintering populations along several rivers on Forest.
Sensitive	Ferruginous Hawk	Feeding, nesting and rearing occur on Forest in several areas.
	Swainson's Hawk	Same as ferruginous hawk
	Wolverine	Abundant habitat exists on Forest, but sightings are uncommon.
	Long-billed Curlew	Habitat exists on Forests and scattered sightings have occurred.
	Western Spotted Frog	Habitat exists on Forest, but populations not identified at present.
	Preble's Shrew	Habitat exists on Forest, but populations not identified at present.
	Townsend's Big-Eared Bat	Known to occur within the the Forest but the range and population size are unknown.

Plants

List	Species	Status
Endangered	MacFarlane's Four O'clock	Currently found at three sites in Snake River Canyon.
Threatened	None	
Sensitive	97 species	See FSM 2670, W-W Supp. No. 12.

g. **Visual Quality**. While the value of visual quality is not directly included in the PNV calculations, its value is indirectly represented through the consideration of recreation as a priced benefit. It is reasonable to assume that providing positive visual experiences has a direct relationship to the quantity and quality of recreation on the Forest. However, a large number of people who benefit from the visually appealing scenery are not tallied as recreation users of the Forest. For example, homes are often sited so as to provide better views of the Forest. This visual appreciation occurs even within the corporate limits of cities well removed from Forest boundaries.

h. **Roaded Accessibility**. Transportation facilities for the Forest include 9,300 miles of road, 6,280 miles of which are open for use, 1,750 miles of trail and five landing strips. In addition, the Snake River provides 68 miles of river that are a part of the transportation network. The transportation system is established and is likely, with certain construction and reconstruction projects, to be satisfactory for serving most future management scenarios. Exceptions are the relatively few undeveloped areas (not including wilderness) that will require additional roads if they are to be managed for timber production.

The present trail system primarily serves the four wilderness areas, unroaded areas in the Hells Canyon National Recreation Area and the Elkhorn Range. Whereas the trails once served many administrative purposes, there is now management concern that the trail system needs to be brought more in line with recreation needs.

Roads are the most important and most impacting of the transportation facilities. The total number of miles of road open to public use has been identified as a facet of an issue to be dealt with in the Forest Land and Resource Management Plan. Alternatives vary in the extent to which they build new roads and in the extent to which they access previously unroaded areas.

V. SOCIAL AND ECONOMIC IMPACT ANALYSIS

A. Social and Economic Overview

1. Forest Area of Influence Established for Economic Analysis

To assess the current economic conditions and to estimate potential changes, a Forest Area of Influence was determined. This is the geographic area wherein the majority of Forest products are first used and wherein public concern is concentrated. This zone comprises Baker, Union and Wallowa counties (hereinafter referred to as the Tri-Counties) in northeastern Oregon. It is well recognized, of course, that for some activities such as elk hunting that the Forest's area of influence has a much greater geographic spread.

The Tri-Counties is a rural area whose basis for existence lies in the successful development of its natural resource base. Development of employment opportunities beyond this base is sorely lacking. A description of why this has happened--or rather, has not happened--explains a great deal about the people who live here and about the area in which they live.

It is an area separated by long distances from major metropolitan areas whose influence is nevertheless felt in the form of their radio and television signals, their newspapers, and through business and social dealings. Interstate Highway 84 and the Union Pacific Railroad comprise the area's major physical links with the outside world. Scheduled air service arrives and departs with the fortunes of the area. Harsh winters severely limit the possibility of establishing the area as a center for retirement. Majestic mountain ranges and beautiful canyons succeed in luring tourists to the area, but the mainstays of the economy are timber, agriculture, and minerals.

Because the area has not succeeded in attracting diversified employment opportunities, its total population has shown very little change for decades as technological improvements have reduced even the existing employment opportunities. Ironically this has occurred right along with increases in timber production from the Wallowa-Whitman.

There is, in fact, a marked ambivalence toward growth in the area. People want gainful employment for themselves, for their families, but are uncertain of the benefits of an increasing population. The two do, however, go together and the entrepreneurial energy necessary to establish an expanding economic base in the face of this dilemma has not been adequate to the task. Development has been largely limited to those endeavors which enjoy significant locational advantages.

This general lack of expansion has undoubtedly contributed to the area's generally high degree of social stability as manifested in its exemplary showing in such areas as crime, the social problem indicators in general, and resident perception of the area's quality of life (QOL). It has also resulted in a sizeable outmigration of young adults.

Perhaps the feelings of the local inhabitants toward the area are best summarized by the thought that it is a fine place to live (if one is fortunate enough to find employment) and that nothing should be done which might spoil it.

Table B-12 shows area population by county over time and provides a basis for comparison with the population of Oregon. As reflected in the table, much of Oregon's development has bypassed the local area.

Table B-12
AREA POPULATION OVER TIME

County	1930	1940	1950	1960	1970	1980
Baker	16,754	18,297	16,175	17,295	14,919	16,134
Union	17,492	17,399	17,962	18,180	19,377	23,921
Wallowa	7,814	7,623	7,264	7,102	6,247	7,273
Tri-County	42,060	43,319	41,401	42,577	40,543	47,328
Oregon	953,786	1,089,684	1,521,341	1,758,687	2,091,385	2,633,149

Sources: R. Bruce Mackey and Michael J. Blaine, Social/Economic Assessment Hells Canyon NRA USDA Forest Service, 1978, pp. 6, 7. Original Source: U.S. Department of Commerce, Bureau of the Census. 1980 data from Center for Population Research and Census, Portland State University, 12/31/82, pp. c, 2, 7. Original Source: U.S. Department of Commerce, Bureau of the Census.

The area of influence is defined as the three counties of Baker, Union and Wallowa situated in the northeastern corner of Oregon. The neighboring counties of Grant, Malheur, and Umatilla were excluded due to the limited quantity of the Forest outputs which they receive (see Table B-13). Likewise, the relatively small outputs from portions of the Idaho counties of Adams, Idaho, and Nez Perce included in the Forest as part of the Hells Canyon National Recreation Area (NRA) do not justify increasing the size of the primary area of influence.

The lay of the land and the road system have combined to concentrate forest users in their immediate environs.

Hunters, woodcutters, picnickers and others tend to use the most convenient opportunities; and for the adjacent counties those opportunities are largely presented by the Malheur, Umatilla, Nezperce and Payette National Forests.

Table B-13
LOG FLOW TO MILLS FROM THE WALLOWA-WHITMAN BY COUNTY 1/

	1972		1976		1982	
	MBF	% Total W-W Logs	MBF	% Total W-W Logs	MBF	% Total W-W Logs
Baker	64,645	38	97,647 2/	62 2/	37,521	30
Grant & Harney 3/	---	0	---	0	5,160	4
Umatilla & Morrow 3/	7,064	4	5,400	3	10,652	9
Union	71,217	42	53,879	34	20,519	17
Baker-Union 4/					11,674	9
Wallowa	25,303	15	--- 2/	--- 2/	36,561	29
Crook	---	0	---	0	2,204	2
Tri-County Area	161,165	96	151,526	96	124,291	85

1/ Sources: 1980 Data: James O. Howard and Bruce A. Hiserote, Oregon's Forest Products Industry 1976 USDA Forest Service Resource Bulletin PNW - 79 1978 (Portland: USDA FS, 1978), p. 28. 1972 Data: John P. Schuldt and James O. Howard, Oregon Forest Industries 1972, (Corvallis, OR: Oregon State University Extension Service, 1974), p. 38.
2/ Wallowa County figures were joined with the Baker County figures to avoid disclosure of information on any individual mill.
3/ Combined to avoid disclosure of information on any individual mill.
4/ Includes one veneer and one plywood mill each from Baker and Union counties, combined to avoid disclosure of information on any individual mill.

The Tri-County area comprises a region resplendent in recreational opportunities, scenic vistas, and panoramas. Forested mountains give way to foothills and plains where livestock and agriculture hold sway. The region would best be described as holding a rural orientation with an overall population density of only six people per square mile. General comments on the individual counties follow:

2. Baker County

The Baker Valley is a large and fertile alluvial plain roughly 18 miles wide and 50 miles long. The county area is 1,964,000 acres (3,100 square miles) and the major land uses are agriculture (49 percent) and forestry (39 percent) (EOCDC 1975, p. 2-2).

The county is dissected by Interstate 84 on a northwesterly to southeasterly axis. It contains portions of the Eagle Cap, North Fork John Day, and Monument Rock Wildernesses, the Elkhorn Mountain Range and the Hells Canyon National Recreation Area. Population is centered in the valleys.

a. Population. Baker County population for 1980 was 16,134 with the city of Baker, the county seat, representing some 9,471 of that total (CPRC 1984, p.2). In addition there are a number of small population centers scattered throughout the county.

According to the 1970 census 12 percent of the population was over 65 years of age; by 1980 the incidence had increased to 16 percent. This percentage is one of the highest in the State and the highest for the counties in Eastern Oregon. Baker County's tendency toward a retirement-age population was intensified during the 1960's by an emigration of young adults, leaving to seek jobs.

The growth potential of Baker County is dimmed by the cyclical nature of the lumber and wood products industry and a lack of economic diversification. However, between 1970 and 1977, population increases occurred which reversed the 1960 to 1970 decline. As in other parts of the Region, growth occurred in response to an expanding lumber market, increased tourism, and local construction projects such as the cement plant at

Durkee and power house expansion at local hydroelectric facilities. Employment has since stabilized and entered into a decline with the recent setbacks to the timber industry and the completion of said projects.

b. Climate. (Valde 1973a, p.3). Baker County's climate is semiarid, characterized by low precipitation and by low winter and high summer temperatures. The topography of the county produces considerable local variation in climate.

The average annual precipitation varies from extremes of 80 inches at mountain tops to eight inches in the Haines area of the Baker Valley. Annual precipitation in the cropland areas is generally less than 20 inches. About

50 percent of the precipitation falls during the irrigation season--April through September. During the summer months, much of the basin is subject to violent cloudburst storms of small areal extent and high intensity. These storms are the cause of severe soil erosion and flood damage, and they increase soil moisture very little.

Annual snowfall varies from a trace along the Snake River to several feet in the upper reaches of the mountains. Mountain snowpacks are important sources of water for irrigation, fish, wildlife, domestic use, and other uses. The mean annual snowfall from 1950-1960 was 30 inches at Baker and over 250 inches at Cornucopia in the Wallowa Mountains.

The prevailing winds are northwest in the summer and southeast the remainder of the year. The wind velocity usually ranges from 6 to 8 miles an hour, with the highest velocities in December, January and February.

The mean annual temperatures in the cropland areas vary from 44 degrees at Baker to 53 degrees at Huntington. Temperature extremes vary from below -30 degrees at Baker to 110 degrees at Huntington.

The average growing season ranges from 60 days in the mountains to 200 days along the Snake River. The average frost-free season at different locations are as follows: Baker, 140 days; Richland, 180 days; and Huntington, 180 days.

c. Employment. Baker County relies upon government, trade, agriculture, and the lumber and wood products industry for some 60 percent of employment opportunities (Mason 1979a, Tables 6 and 9). In recent years Baker County has had one of the highest unemployment rates in the State (16.7 percent in 1982 (CPRC 1984, p. 21)).

d. Income. Median family income in Baker County for 1978 ranked 35th out of the State's 36 counties ($13,885) (Mason 1979a, Table 3). Per capita personal income rated 32nd (1977: $5,592) (Mason 1979a, Table 4). Thirteen percent of the families existed below the poverty level in 1980 (CPRC 1984, p. 21).

e. Recreation Outdoor recreation plays a large part in the county's leisure time activities. Rodeos, hunting, camping, snowmobiling, skiing, fishing and numerous other activities are all offered locally. Most park and recreation facilities are in the National Forest and the State Park systems.

f. Public Attitudes and Values It seems that the people who live in Baker have learned to combine the amenities of the outdoors with an increasingly urban lifestyle. The county is still composed of rural communities with economies based on agriculture and forestry. Seasonal employment and a fluctuating economy continue to plague the area. There is a wide range of attitudes toward development and recreation.

3. Union County

The Grande Ronde Valley is a diamond-shaped fertile plain 20 miles long by 12 miles wide. It contains the great bulk of the county's population (EOCDC 1975, p. 2-2). The county consists of 1,301,760 acres (2,034 square miles) with the major land uses being forestry and agriculture (EOCDC 1975, p. 2-2). This county lies north of Baker County and also has a northwest-southeast diagonal transverse by Interstate 84.

a. Population. Since the 1950's Union County has experienced a slow but continuous growth. A small but steady net in-migration and more varied job opportunities have contributed to this growth trend. Eastern Oregon State College; expanded trade, government, and service sectors; and the establishment of some new industry have stimulated growth in both rural and urban areas throughout the county.

La Grande, with a population of 11,325 (CPRC 1984, p.7) has attracted a younger population than Baker or Wallowa Counties. The county population in 1980 was 23,921 (CPRC 1984, p. 7).

b. Climate. (Valde 1973b, p. 2) Precipitation in Union County is greater than in most of central and eastern Oregon because the cooling of the winds passing over the Blue Mountains reduces their moisture-holding capacity. Average annual rainfall in the county varies from location to location with the areas just east of the Blue Mountains receiving an average annual rainfall of just below 20 inches, whereas areas further east have averages varying from 11 to 14 inches. A high proportion of the rain and snowfall occurs in the winter and spring months with little rainfall recorded during the summer growing season. Consequently, water flow in the major streams may vary from a high of 50 percent of the annual stream flow occurring during the two months of April and May to a low in August and September when streamflow per month may drop to less than one percent of the annual flow.

Temperatures have a maximum range of close to 140 degrees. The absolute maximum temperatures are just above 100 degrees, and the absolute minimum temperatures are about -35 degrees. The average mean temperature in La Grande is about 50 degrees, with mean temperatures for other locations in the county varying from this value depending largely on elevation. The average date for the last killing frost is April 24 and that of the first killing frost is October 2, so that a growing season of up to 160 days can be expected.

c. Employment. Unemployment within the county has followed state trends and increased from 1970 to 1973 averages of 7 percent to an average of 13 percent in 1975 (Mason 1979b), and 13 percent in 1982 (Street 1984). The trend in Union County, like its neighbors Baker and Wallowa, has been towards an expanding labor force and declining employment opportunities.

The principal employers are government, trade, and lumber and wood products manufacturing (Mason 1979b).

d. Income. Median family income was the best of the three county area in 1978 at $16,957 - enough to rank it 13th among the State's counties. Per capita personal income in 1977 amounted to $6,044 and ranked it 26th out of the state's 36 counties. The 1970 census showed 10.8 percent of the families below the poverty level; the 1980 census, 12.4 percent (CPRC 1984, p.21).

e. Recreation Union County has 11,087 acres in State and local parks. Park and recreation facilities also exist in Umatilla National Forest and the Wallowa-Whitman National Forest. Hunting, biking, camping, fishing, snowmobiling, boating and skiing are among the activities pursued in these areas.

f. Public Attitudes and Values (Beecher 1975, p.57) Forest and agricultural interests generally favor development unless it interferes with production. This sentiment is tempered in the case of their employees who have come to recognize the cyclical/seasonal nature of their employment and the need for more employment options. The business community supports development, particularly when it is based upon short-term trade promotion and return.

A third group, supported by the Chamber of Commerce, the local Industrial Development Corporation, the County Planning Staff, and the Eastern Oregon Community Development Council, are interested in long-term development planning.

The people of Union County have developed interests in a variety of cultural and social activities. La Grande is a cultural and educational center for eastern Oregon.

4. Wallowa County

The fertile Wallowa Valley is a V-shaped, rolling area with elevations ranging from 4,300 at Wallowa Lake to 2,800 feet at the town of Wallowa. The valley extends northward about 20 miles with Enterprise near its northern limit. The county consists of 2,035,840 acres (3,181 square miles) with most of the land devoted to forestry and grazing (EOCDC 1975, p. 2-3)

a. Population. Wallowa County, isolated and sparsely populated, had been losing population since the 1940's. In the early seventies this trend was reversed. Between 1970 and 1977, largely due to prosperity in the forest industry, Wallowa County experienced a 6.1 percent population increase. Wallowa County's population for 1980 is 7,273; 2,003 in Enterprise, its largest city (CPRC 1984, p.7).

b. Climate. (EOCDC 1975, p. 4-3) Sunshine prevails throughout most of the year with less than 100 days in the normal year having measurable precipitation. Summer days tend to be hot on the central plateau but the nights are cool. Winters can be severe, particularly in the higher elevations. There is an average frost-free growing season of slightly more than four months, but the average is not an absolute; frost can come in any season, and has, although this is a rare occurrence.

There is a wide range in annual precipitation from a high of 60 inches in the south central mountains to a low of 12 inches on the central plateau. Annual average precipitation at Enterprise, the county seat (which is also near an average elevation) is slightly more than 13 inches. Most of this comes in the late winter and early spring and practically all at the higher altitudes is in the form of snow. Some snow remains during most summers on the higher peaks, but there is no appreciable glaciation.

c. Employment. The principal employers are government, agriculture, trade and the lumber and wood products industry.

d. Income. The median family income for 1978 in the county was $14,065, second lowest in the State. Per capita personal income in 1977 was $5,998, for a State ranking of 28. In 1970, 15 percent of the families were below the poverty level; in 1980 11 percent (CPRC 1984, p. 21)

AVAILABLE

e. Recreational Activities. Although recreation is still a small industry in Wallowa County there are a number of organized events and activities in which the local community participates. These include rodeos and fairs. State parks and National Forests provide a number of facilities and attendance is high for the region. Park facilities are generally oriented towards trailer camping and hunting, although a wide variety of activities are provided.

f. Public Attitudes and Values. (Beecher 1975, p.57) From Wallowa County's early history, ranchers and cattlemen have opposed immigration for fear that rangelands would be divided and sold into parcels too small for grazing. This desire to retain a sparsely populated land is still strong among ranchers and farmers. The county has been isolated from urban pressures and economic development. Recently economic diversification has increased with the expansion of National Forest and State Park facilities. The logger and the agricultural worker have learned to cope with the seasonal fluctuations and economic instability by developing multiple job skills.

B. Determination of Social Effects

1. Social Effects

Social effects are changes in communities, peoples' beliefs, and their ways of life. Specifically, the social effects of the Forest Plan alternatives are the different social conditions that are caused by Forest management directions that are different from a continuation of current management direction.

Estimation of social effects is a two-step process. First, the conditions that are expected under the current management direction (Alternative A) over the next 10 years are estimated. Then the factors that would change because of different management direction (alternatives) are noted and compared to the current management direction, or "baseline," conditions.

The following categories encompass the significant social effects of the Forest Plan alternatives. The social effects of the alternatives were estimated for the counties separately, but the effects are often similar. The social effects for the Tri-Counties are reported together and special note made where the effects on any one county are substantially different.

a. Lifestyle and Job Dependence Effects are indicated by significant changes from baseline conditions (Alternative A) in the patterns of work, leisure, and other activities. Dimensions include the availability and characteristics of jobs, recreational activities, aesthetic and amenity ties to the Forest, and the gathering and use of food and fuel from the Forest.

b. Beliefs and Perceptions. Significant effects are indicated by outputs and practices at odds with the understandings and emotional values people have for the Forest. Dimensions include concerns that familiar places will be changed, that full use of Forest commodities will be restricted, and that disliked or unsound practices will occur. People have concerns for visual qualities, for the Forest as a natural or managed ecosystem, for environmental qualities, and for historical and cultural sites and characteristics.

c. Sense of Control/Sense of Self-sufficiency. These effects are indicated by changes from the baseline conditions in the degree of control affected groups perceive they have over the Forest compared to outside forces (e.g., government, interest groups, industries). It also reflects the affected groups' sense that they can contribute to their subsistence needs (food, fuel, shelter) by their own direct knowledge and effort. Dimensions include concerns about government restrictions on uses and practices, and changes caused by special interest groups. People who gain food or fuel directly from the Forest are concerned about reduced access or supply. Because local area inhabitants rely so heavily on the Forest, their sense of control or self-sufficiency is more profoundly impacted by Forest actions than are others. Next in order of significance would be the recreationists from outside the area who have, in many cases, been returning to the area for years. This latter group and other recreationists would suffer a loss in their sense of control or self sufficiency if their existing recreational benefits were reduced.

2. Categories of Social Effects Considered, But Not in Detail for Each Alternative

In addition to the three main categories of social effects, the effects of the alternatives on population change and the effects on land use and ownership were examined.

a. Population Change. The Draft Forest Plan alternatives will affect the level of economic activity in the Tri-Counties through anticipated changes in employment. This may ultimately affect migration and population. Many short-term changes can, however, be accommodated without changes in population.

In recent years, migration has been responsive both to employment opportunities and to a variety of amenity and lifestyle factors so that a precise population projection tied to the Draft Forest Plan alternatives is not presented. However, employment and population are generally recognized as being directly related.

b. Landownership and Use Changes Land exchanges will be primarily with private parties, corporations, or other government agencies which normally use the land for purposes similar to current National Forest management. Land for development is generally located off the Forest, and land use in the Tri-Counties is not significantly affected, either directly or indirectly, by the alternatives in the Draft Forest Plan.

3. **Constants**

These factors with potentially significant social effects are treated the same by all the Forest Plan alternatives. Thus, they have no social effects with respect to the Forest Plan alternatives.

Hells Canyon National Recreation Area. Management of the HCNRA is the same under all Forest Plan alternatives.

Municipal Watersheds. Water quality and quantity are protected by all alternatives.

C. Use of the IMPLAN Computer Model to Estimate Effects on Jobs and Personal Income in the Local Area

1. Input-Output Models (Alward and others, n.d.; Palmer 1976)

Any developed economy, whether national, regional, or local, is characterized by a high degree of interdependence among its producing sectors. Each economic sector not only produces goods or services but is also a consumer itself, purchasing other goods and services for use in the production process. Interindustry relations have been recognized for a long time. Francois Quesnay's "Tableau Economique" of 1758 developed the circular flow and general equilibrium concepts, while Walras stressed the interdependence between the production sectors of an economy with his general equilibrium model in the 1870's.

The first empirical application of the input-output model in the Anglo-American world dates from 1936 when Leontief published an input-output system of the United States' economy. What Leontief did was to simplify Walras' generalized model so the model's equation could be estimated empirically. He used two simplifying assumptions. First, the large number of commodities in the Walrasian model was aggregated into relatively few outputs, one for each industrial sector. Second, the supply equation for labor and demand equations for final consumption was abandoned and the remaining production equations were expressed in their simplest, linear form.

These simplifying assumptions make a sharp difference between input-output and most other conventional economic models. The linearity does not allow factor substitution or economies of scale. Time is missing, yet the purchase of inputs by one industry to make goods to sell to other industries implies a period analysis. The prevalence of joint products and multi-product plants makes it impossible to aggregate only those plants with similar output and inputs structures together.

However, the model is starkly simple. Its key variables are the outputs of sectors into which the economy is divided. Each sector's output consists of summing its sales to all other sectors and to final demand. The amount of each product which each sector consumes depends only on the level of output in the consuming sector. Equilibrium in the economy is attained when the output of each sector equals total purchases from that sector, these purchases being determined by the output of all other sectors.

Because of these simplifying assumptions and the simplicity of the model, it is empirically implementable. The implausible assumptions of the production function do not appear to restrict the model too badly. Technology changes are slow enough so the input coefficient matrix of one year seems to be good for several years. Even out-of-date tables can show the maximum input requirement. Perhaps most important of all, input-output models pass the critical test that for many purposes they predict reasonably well.

2. Development of IMPLAN

The USDA Forest Service developed IMPLAN to assist its land and resource management planning efforts in economic impact assessment. IMPLAN utilizes input-output analysis procedures to provide forest planners with the capability to develop non-survey based interindustry models and apply them to the evaluation of alternative management programs.

The IMPLAN data base consists of two major parts: (1) a national-level technology matrix and (2) estimates of sectoral activity for final demand, final payments, gross output and employment for each county. The data represent 1977 county level economic activity for 466 sectors as shown in Table B-14.

Table B-14
CONTENTS OF THE IMPLAN DATA BASE FOR EACH U.S. COUNTY

A. Final Demand

   1. Personal Consumption Expenditures
   2. Capital Formation
   3. Inventory Change
   4. State and Local Government Expenditures
   5. Federal Government Expenditures
   6. Foreign Exports

B. Final Payments

   1. Employee Compensation
   2. Indirect Business Taxes
   3. Property-Type Income

C. Total Gross Output

D. Production Employment

The national technology matrix denotes sectoral production functions and is utilized to estimate local purchases and sales. This 466-sector, gross domestic based model was derived from the Commerce Department's 1972 national input-output model (U.S. Department of Commerce 1979a). The "use" and "make" tables were rectified to an "industry by industry" basis and updated to 1977 using relative price changes and the RAS* procedure (Stone and others 1962) with the 1977 National Income and Products Accounts (U.S. Department of Commerce 1977a) information used as control totals. Aggregation of some agriculture, construction and manufacturing sectors, and disaggregation of the mining sectors resulted in the reduction in the number of sectors from 496 in the Department of Commerce tables to 466 in IMPLAN. The matrix is a highly disaggregated representation of national average sectoral input and output technology and it is on the basis of these production functions that regional purchase patterns are estimated.

Estimates of economic activity and production employment for each of the 466 sectors for all states and every county within each state were made for the components of an input-output table. The estimates of economic activity for states and counties were made through a "downward movement" approach beginning with total national activity and disaggregating to states and ultimately to counties with control totals employed at each level. As previously noted, the updated 1977 national table was benchmarked with the 1977 National Income and Product Accounts. Since comparable accounts are not available for states or counties, the most suitable regional measures of economic activity were used to disaggregate the national production and demand activity, first among states and then among counties within each state.

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*RAS is a procedure used to update technical coefficients.

Gross output and employment estimates utilized several sources, principally censuses. For example, agriculture sector activity used the Census of Agriculture (U. S. Department of Commerce 1977a) and Agriculture Statistics (U.S. Department of Agriculture 1979). Gross output measures for most other sectors* (U. S. Department of Commerce 1979a) utilized proxy measures derived from employment and payroll data, principally the national summaries of the County Business Patterns (U. S. Department of Commerce 1977c) and employment data from the Dun and Bradstreet Corporation (Dunn and Bradstreet Corporation 1977). Some sectors could be related to specialized data sources such as the Census of Housing (U.S. Department of Commerce 1970) for owner-occupied dwellings and the Census of Governments (U.S. Department of Commerce 1977d) for government related sectors. All data was adjusted to the 1977 base year and unreported data was estimated utilizing the RAS procedure.

Final demands were estimated consistent with control totals from the National Income and Product Accounts, by updating the 1963 Multi-Regional Input-Output data (Polenske 1979) using the RAS procedure as suggested by McMenamin and Harring (McMenamin and others 1974). The three components of value added were allocated on the basis of gross outputs. Both final demand and final payment estimates were disaggregated using the "downward movement" approach.

In its entirety, the IMPLAN data base provides a comprehensive, Nationwide set of input-output information which can be used to construct non-survey based regional tables. The national technology matrix is maintained at the highly disaggregated 466-sector level of detail which greatly reduces aggregation errors caused by using 1- or 2-digit SIC (Standard Industrial Classification) industry groupings. Consequently, the industry-commodity relationship is much more consistent than in highly aggregated models. The hierarchical nature of the data base, achieved by the use of published control totals at each level of disaggregation, results in a data base that permits the construction of models that are consistent both in terms of definition and activity. These principal aspects result in significant improvements over the data used in many previous non-survey input-output studies.

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*Bureau of Economic Analysis input-output sectors 3.00 through 77.05, excluding sectors 11.00, 12.00, 65.01, and 71.01.

Data Reduction. The IMPLAN software system was designed to serve three functions: (1) data retrieval, (2) data reduction and model development, and (3) impact analysis.

The data retrieval system was designed so that the user could have access to input-output data for any U. S. state, county, or combination thereof. The study area data is referenced via a standard set of state and county codes with the extracted data treated as control totals for the region being analyzed. Modification of data, if desired by the user, is permitted.

Utilizing the national technology matrix and the regional control totals, a data reduction method is employed to develop a regional input-output table. The method used exploits the property of "Openness" displayed by regional economies compared with the national economy (Richardson 1972). Regional economies exhibit much greater propensities to import and export than is observed at the national level. Based on the assumption that trade balances are the principal difference between national and regional purchase patterns (that is, industry production functions are identical but regional imports and exports make local interindustry transactions different), the supply-demand pool technique (Schaffer and others 1969) for data reduction was adopted.

This method for constructing a regional table begins with the national technology matrix and regional data for gross outputs, final demands and final payments. Regional data for all 466 sectors is sorted with respect to gross outputs. If the sectoral gross output is greater than zero (firms producing the commodity exist within the region), the corresponding column of direct coefficients is extracted from the national matrix.

Using regional gross outputs and the abbreviated matrix of national direct coefficients, regional purchase transactions are computed. This transactions matrix is then scanned row by row. If the industry represented by any row has zero regional gross output (the industry does not occur within the region) the estimated purchases of that commodity are assumed to be noncompetitive domestic imports and are shifted from the regional transactions matrix to final payments. If the gross output is positive and the commodity balance shows a surplus*, the domestic import purchases are assumed to be zero, the regional transactions estimated with national direct coefficients are left unchanged, and the surplus is assumed to be domestic exports. If the commodity balance indicates a deficit, the regional final demands and transactions estimated with the national coefficients are proportionately reduced across the row to obtain a balance, and the differences assumed to be competitive domestic imports. The result of this process is a matrix of local transactions between regional industries plus estimates of both competitive and noncompetitive imports as well as exports.

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*Regional gross output is greater than regional final demand plus intermediate demand estimated with national direct coefficients.

The data reduction procedure used in IMPLAN produces a complete table of regional input-output accounts.

In addition to this typical table of accounts, detailed reports of sectoral competitive and noncompetitive import purchases are given. Based upon the regional accounts, the predictive input-output model can be derived by computing the standard Leontief-type inverse and calculating various income and employment multipliers. If appropriate, the number of sectors in the model can be reduced through aggregation prior to inverting the matrix.

Several limitations to nonsurvey data reduction techniques have been noted (Richardson 1972, Fisch and others 1978) and the supply-demand pool procedure likewise has limitations. One principal limitation of the supply-demand pool technique is that cross-haul conditions are ignored while evidence suggests that this may be a common occurrence in regional economies. This arises from the technique's method of allocating local production to meet local requirements before imports or exports are estimated.

Through the use of a highly disaggregated technology matrix and a consistent data base, the IMPLAN system has mitigated though not eliminated many limitations noted by others. For example, Richardson (1972) commented that the use of the national technology matrix may overestimate the interdependence of a regional economy. Similarly, Miernyk (1965) criticizes the supply-demand pool technique assumption of proportionate imports by all purchasing industries. Continued improvements are being sought to enhance the system.

Estimating the regional economic impacts of disturbances in the final demand sector caused by resource management actions is the most frequently used form of input-output analysis employed in Forest Service planning studies. These demand disturbances arise from such activities as changes in timber harvesting, grazing and recreation, as well as direct budgetary expenditures for goods and services. Economic impacts are expressed by the changes in regional income and earnings, employment, gross output and various other parameters.

Input-output models are typically used in Forest Service planning studies to estimate the regional economic effects of implementing alternative management plans. These plans describe the intended management activities on a National Forest along with the expected outputs, resource uses and budgetary expenditures. Economic impacts are characterized as changes (increases or decreases) from current conditions. Planning teams frequently employ input-out models in other ways. The models provide excellent descriptions of regional economic structure, giving planning teams valuable information for formulating Agency policies regarding economic growth or stabilization.

The linkages between Forest Service management actions and corresponding estimates of net changes in regional final demands are critical components in the use of input-output analysis for impact estimation. These disturbances in final demand arise from two principal sources: public expenditure effects and private sector output effects (Cartwright 1979). Public expenditure effects arise from demand disturbances caused by government purchases of goods and services. For example, timber stand improvement projects or the construction of recreational facilities involve purchases for labor, materials and so forth which can directly be transformed into a demand disturbance vector. Private sector output effects are somewhat more complex. These effects stem from the use of forest resources and indirectly (from the viewpoint of the Forest Service) result in demand disturbances. For example, the Forest Service's provision of various "factors of production" such as stumpage for wood products, water for municipal and domestic uses, and forage for red meat production must be traced to its final regional economic use, either directly to exports or via "forward linkages" and "stemming-from" effects. See, for example, Roesler and others (1968). The effects of the use of forest resources for recreation can be directly transformed into demand disturbances by deriving a typical "bill of goods" purchased locally by the recreationist during the pursuit of such activities. In all cases the demand disturbances represent regional market transactions expressed in purchaser's prices with appropriate transportation and trade margins.

Traditional applications of input-output models, utilizing demand disturbances as the source of interindustry effects, contain an implicit assumption of sufficient resource supply to permit attainment of an equilibrium economy. As is often the case with forest resources, some of the primary resource supplies may be restricted within a regional economy (for example, the amount of water may be restricted). If the change in forest output is used, under these circumstances, to derive a disturbance in demand and the model used to estimate the resultant multiplier effects, the backward linkages would usually indicate a total demand for the resource exceeding the original change. The IMPLAN system has been designed to perform analyses under these conditions by permitting the user to link the change in resource output directly to change in sectoral gross output rather than a change in final demand. The input-output model is then used to estimate the maximum level of delivery to regional final demands attainable given the constrained level of gross output. This kind of analysis is often applicable to economies that are highly dependent upon primary resources.

The economic effects estimated with IMPLAN are described by parameters typical of input-output studies. They are structural in nature, permitting multiplier effects to be traced throughout the various regional sectors. Direct, indirect and induced changes in gross outputs and final demands, employment and import requirements, income and earnings are the most representative parameters used to describe impacts. The availability of a complete table also permits calculation of gross regional product. Induced effects are computed using a modified "Type III" multiplier procedure (Miernyk 1965), iteratively solving the open model to capture the effects of induced consumptive spending. Detailed employment analysis is possible by tracking employment requirements among various occupations, and accounting for the effects of either inmigration of workers or reemployment of unemployed local labor. In combination, this information provides a comprehensive, detailed account of potential regional economic impacts.

3. Use of IMPLAN on the Forest

As discussed earlier in this document, the Wallowa-Whitman National Forest's primary impact area is Baker, Union, and Wallowa counties in northeastern Oregon. Accordingly, the first step in applying the IMPLAN model was to access IMPLAN and generate a single model comprising those three counties. Pursuant to discussion with cognizant IMPLAN personnel (Siverts 1985), adjustment was made to the population figures to reflect the relatively high levels of government employment in the Tri-Counties. This presents an overestimation of effects which would otherwise result due to IMPLAN's reliance on correct portrayal of population (less government employees and their dependents): private employment relationship. That done, estimates were made as to the effects changes in final demand would have. These "effect groups" were developed for sawtimber volume, roundwood volume, livestock grazing, and a weighted average composite of the various Forest recreational activities. The process involved estimating the dollar values which would be injected into the local economy as a result of the various activities. For instance, a Final Demand Value for 1 MBF was estimated at $289.68 as follows.

Table B-15
DERIVATION OF MANUFACTURED PRODUCT SELLING VALUE PER MBF OF SAWTIMBER
(1977 Dollars)

Statistical High Bid	$ 58.80
Logging Cost	87.87
Purchaser Credit Road Costs	18.33
Manufacturing Costs	124.68
Manufactured Products Selling Value	$289.68

Values were taken from Report--5 Summary of Appraisal Elements by Product and Measurement Unit dated May 16, 1979 which was itself drawn from Forest Service Forms 2400-17. The self source was used for roundwood valuation as shown below in Table B-16.

Table B-16
DERIVATION OF MANUFACTURED PRODUCT SELLING VALUE PER CCF OF ROUNDWOOD
(1977 Dollars)

Statistical High Bid	$ 0.53
Logging Cost	39.58
Purchaser Credit Road Costs	2.62
Manufacturing Costs	20.00
Manufactured Products Selling Value	$ 62.73

The resulting figures were then converted into the more workable MMBF and MMCF measures. These were then input to IMPLAN for an IMPACT run. The total change to Final Demand was disaggregated with the great bulk of activity attributed to Sector 137--Aggregated Primary Wood Processing--and a relatively small portion of road construction work being assigned to Sector 51--New Construction. This split in Final Demand was coordinated with cognizant personnel (Sivert 1985). A Range Final Demand figure of $17.92 was used per the Regional Office direction package of September 24, 1984, applied to Sector 3, Meat Animals and Miscellaneous Livestock.

Because of the wide diversity of experiences which are tracked as recreation, and because so many sectors are involved in providing it, considerably greater detail was needed to reflect recreation activities in IMPLAN.

The first step in tracking recreation was to categorize all Forest recreation according to the recreation expenditure categories provided by the Regional Office. The following list is a compilation of those expenditure groupings found on the Forest.

Fresh Water Fishing
Water Fowl Hunting
Small Game Hunting
Big Game Hunting
Non-Consumptive Wildlife Use
Recreation Residence Use
Visitor Information Service
Water Based Recreation
Gathering Forest Products
Camping
Downhill Skiing
Snow Play
Picnicking

Dispersed Nonmotorized Recreation Not
Elsewhere Classified
Dispersed Motorized Recreation Not
Elsewhere Classified

That done, recreational expenditures by category identified in said Regional Direction Package were parcelled out to the respective sectors identified in the local economy. Because the information generated by IMPLAN was to be used to reflect first decade conditions alone, a single weighted composite recreational expenditure category was produced. The resulting figure was used for all recreation categories for all alternatives because estimated total recreation use varies at the most in decade one only by about 1 percent.

The Jobs and Personal Income coefficients shown in Table B-17 which resulted from increments of 1 MMBF of sawtimber, 1 MMCF of roundwood, 1,000 AUM's, and 1,000 RVD's were then applied to alternative output levels to generate estimates of jobs and personal income.*

Table B-17
TOTAL EFFECT COEFFICIENTS (DIRECT, INDIRECT, AND INDUCED)

Category	Jobs 1/	Personal Income 2/ (1977 Thousand $)
1 MMBF Sawtimber	10.6	144.5
1 MMCF Roundwood	22.7	311.1
1 MAUM Livestock Grazing	.5	4.0
1 MRVD Recreation	1.1	9.2

1/ "Jobs" does not discriminate between full time, part time, permanent, or seasonal forms of employment. Per personal communication between Dale Pekar and Max Keetch of FCCC on May 10, 1985, "jobs" excludes proprietors.
2/ Pursuant to personal communications between Dale Pekar and Eric Siverts of the Fort Collins Computer Center, coefficients used for Personal Income reflected only that portion of Personal Income in the form of Employee Compensation. As such, the coefficients necessarily defined the lower limit of that range. Including portions of Property Income would be speculative, however, inasmuch as sizeable portions of that income are lost to the local area.

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*Pursuant to personal communications between Dale Pekar and Eric Siverts of the Fort Collins Computer Center, coefficients used for Personal Income reflected only that portion of Personal Income in the form of Employee Compensation. As such, the coefficients necessarily defined the lower limit of that range. Including portions of Property Income would be speculative, however, inasmuch as sizeable portions of that income are lost to the local area.

In relation to total area Personal Income, Forest-related employee compensation accounts for some 14 percent. Exclusive of proprietors, Forest-related employment accounts for about 18 percent of the area's total. Table B-18 summarizes the findings.

Table B-18
FOREST-RELATED JOBS AND PERSONAL INCOME IN RELATION TO AREA TOTALS

Category	Recent Levels	Forest-Related Jobs 1/	Total Jobs	Forest-Related 2/ Employee Compensation 1982 Million $	Total Personal Income 1981 Million $ 4/
Sawtimber	159 MMBF	1685		34.0	
Roundwood	9.6 MMCF	218		4.4	
Livestock	186 MAUMs	98		1.1	
Recreation	1511 MRVDs	1632		20.5	
Total		3633	19,860 3/	60.0	424 3/

1/ Full and part-time; direct, indirect and induced; exclusive of proprietors and unpaid family labor. Not directly comparable to total jobs which is more a reflection of the number of people employed and which includes proprietors and unpaid labor.
2/ Direct, indirect, and induced. Not directly comparable with total personal income which includes property income.
3/ Bill Street, December 1984 Economic Survey Analysis. State of Oregon Employment Division, Department of Human Resources, Appendix. Average of 1982 and 1983. Not directly comparable with Forest-related jobs, see footnote 1.
4/ Street, 1982 data. See footnote 2/.

Disaggregation of effects into their respective direct, indirect, and induced components is presented in Table B-19.

Table B-19
JOBS AND PERSONAL INCOME COEFFICIENTS

JOBS 1/

Category	Unit	Direct	Indirect	Induced	Total
Sawtimber	MMBF	3.74	2.46	4.38	10.58
Roundwood	MMCF	7.99	5.34	9.41	22.74
Livestock	MAUM	.12	.25	.16	.53
Recreation	MRVD	.66	.09	.33	1.08

PERSONAL INCOME 1977 M $ 2/

Category	Unit	Direct	Indirect	Induced	Total	(Total in 1982 M $)
Sawtimber	MMBF	68.0	36.2	40.3	144.5	213.4
Roundwood	MMCF	146.1	78.5	86.5	311.1	459.3
Livestock	MAUM	0.5	2.0	1.5	4.0	5.9
Recreation	MRVD	5.2	1.0	3.0	9.2	13.6

1/ Temporary, permanent, full-time, and part-time; direct, indirect, induced excludes proprietors and family labor.
2/ Employee compensation

VI. ANALYSIS PRIOR TO THE DEVELOPMENT OF ALTERNATIVES

A. Overview of Benchmark Analysis

Much analysis was done prior to the formulation of alternatives in the Wallowa-Whitman National Forest planning process. Numerous required "benchmark" FORPLAN runs helped to define the decision space, the range within which a decision can be made. More specifically, they helped define the maximum economic and biological resource production opportunities, assisted in evaluating the compatibilities and conflicts between market and nonmarket objectives, and define the range in which integrated alternatives would be developed. Benchmarks also test the costs associated with various minimum management requirements of 36 CFR 219.27. They analyze implications of legal and policy constraints such as non-declining evenflow and the culmination of mean annual increment.

Benchmarks are analyses of data designed to provide answers to questions posed by interested parties, both within and outside the Forest Service. The information is presented apart from other planning data to remind the reader that benchmarks are not alternatives. All benchmarks share the same tentatively suitable landbase.

They are approximately implementable, but are not constrained by budget and may require substantial shifts between decades in management activities and in products offered for sale. All benchmark analyses presented below include a maximum present net value objective function. The maximum timber output levels were rerun through a maximize present net value objective function in order to identify the most economically efficient means of obtaining that maximum timber objective.

B. The Development of Minimum Management Requirements (MMR'S)

The following modeling constraints are necessary to meet minimum management requirements of 36 CFR 219.27. The specific constraint, purpose, rationale, and apparent trade-offs are summarized below.

1. Constraint: A maximum area of 33 percent per decade in age class 0 was applied across all existing analysis areas available for regeneration harvest. This is changed to 16.7 percent per decade in higher elevations.

   Purpose: These constraints limit the schedule of harvest to allow for the minimum separation of harvest units necessary to meet requirements of a 40-acre maximum unit size, shaped and blended to the extent practicable and separated by one or more logical logging units

(36 CFR 219.27a). The tighter standard of harvest dispersion in high elevation areas provides for continuity of cover between old-growth patches which is important to the pine marten, an indicator species.

Rationale: Without a harvest dispersion constraint, FORPLAN will frequently schedule all of an analysis area to be harvested in a single decade. Since our analysis areas usually represent timber stands much larger than the acceptable 40-acre maximum unit size, this harvest schedule becomes infeasible in implementation. The 33 percent per decade constraint allows scheduling of all areas for harvest within a given analysis area in approximately three decades.

Tradeoff: The first decade allowable sale quantity and present net value of all alternatives and benchmarks are reduced approximately 18.8 million cubic feet and 66.3 million dollars respectively. While harvest dispersion is generally thought of as a legal or other resource constraint, these constraints contribute substantially to managerial feasibility. For example, species mix and logging systems shift so dramatically between decades without these harvest dispersion constraints that the undiscounted net revenue within Benchmark Run No. 3 drops from 272 million dollars in the first decade to only 19 million dollars in the eighth decade. The mix of timber offered in that eighth period is one that would produce many deficit sales. Logging systems mix without this constraint moves from 52 percent tractor, 48 percent skyline, 0 percent helicopter in the fourth decade to 0 percent tractor, 83 percent skyline, and 17 percent helicopter in the fifth decade.

2. Constraint: Approximately 20,000 acres of riparian zones were constrained to selection harvest only within the FORPLAN model.

Purpose: This constraint serves to limit the harvest schedule to a level which allows special consideration for riparian zones (36 CFR 219.27(e)). It allows maintenance of stream shading at or near current levels, minimizing increases in water temperatures which would be detrimental to salmonids, a management indicator species.

Rationale: Selection harvest was chosen as a scheduling representation of the riparian zone management for FORPLAN. Alternatives considered included a constrained rate of regeneration harvest. However, if regeneration harvest is sufficiently constrained to provide for similar stream shading benefits, the opportunity costs in terms of timber foregone is similar to that expressed under a selection harvest-only constraint.

Tradeoff: The first decade allowable sale quantity and present net value of all alternatives and benchmarks is reduced approximately 3.6 million cubic feet and 4.3 million dollars respectively. Benefits to wildlife occur in the vertical diversity that would be expected to develop along riparian zones where management is limited to selection or group selection and small clearcuts. Salmonids will benefit from the maintenance of stream shade, but it is not possible, given the general nature of our management data, to predict the exact level of benefit. Therefore, we have not assigned any net value to this particular constraint.

3. Constraint: The FORPLAN model was constrained to provide for 28,000 acres of old-growth, managed without timber harvest.

Purpose: The National Forest Management Act requires maintenance of viable populations of all indigenous wildlife species. Old-growth also contributes to maintaining a high level of biotic diversity.

Rationale: As discussed in Section VIII, dedicated old-growth is the most cost effective means of managing for old-growth. While the Wallowa-Whitman National Forest has no species of wildlife which is known to require old-growth forest, a number of large snag cavity dwellers and other species are dependent on either old or mature stands. Schedule of harvest on short rotations will preclude the development of mature stands. Alternative habitat could be provided for cavity nesters by setting minimum snag management levels across the entire Forest in lieu of providing old-growth habitats. This would result in nearly equal fall-down in timber outputs. Fuelwood cutting also reduces snags. By delineating old-growth areas, and minimizing access to those areas, we can better assure that such snags will be maintained at viable levels.

Tradeoff: The first decade allowable sale quantity and present net value of all benchmarks and alternatives are reduced approximately 10.3 million cubic feet and 16.4 million dollars respectively. Substantial improvement in diversity is a benefit.

4. Constraint: No timber harvest is scheduled within the Starkey Experimental Forest.

Purpose: The Starkey Experimental Forest is established by the Chief of the Forest Service and serves to meet research needs of the Service.

Rationale: Timber harvest may occur as part of the research needs of the Forest Service, but cannot be scheduled because of the potential conflicts with research objectives.

Tradeoff: The first decade allowable sale quantity and present net value of all benchmarks is reduced by approximately 5.7 million cubic feet and 9.1 million dollars, respectively.

5. Constraint: No timber harvest is provided within the Indian Creek Research Natural Area.

Purpose: This area was established by the Chief of the Forest Service and its objectives as a research natural area preclude timber harvest.

Rationale: Timber harvest cannot be scheduled because of the potential conflicts with research objectives.

Tradeoff: The first decade allowable sale quantity and present net value of all benchmarks is reduced by approximately 0.3 million cubic feet and 0.5 million dollars.

6. Constraint: The analysis areas within Hells Canyon NRA had harvest dispersion constraints applied (maximum area 13.3 percent per decade in age class 0) which would allow for a near optimum habitat for deer and elk. Additional inventory constraints provide for maintenance of 10 percent of the commercial forest stands in old-growth and 10 percent as mature forest.

Purpose: These include objectives of the Hells Canyon NRA Act of "protection and maintenance of fish and wildlife habitat" and "preservation of ... outstanding and diverse ecosystems."

Rationale: No regional or subregional standards were developed to guide these constraints for the Hells Canyon National Recreation Area, but the language of Public Law 94-199 makes it obvious that additional consideration is necessary.

Tradeoff: The allowable sale quantity and present net value of the benchmarks is reduced by approximately 12.8 million cubic feet and 38.6 million dollars from what would be experienced if the minimum management requirements applied to the rest of the Wallowa-Whitman National Forest were carried into Hells Canyon National Recreation Area as well.

7. Constraint: The Hells Canyon NRA Comprehensive Management Plan Allocations (Management Strategies 8, 9, 10 and 11) were allocation constraints in the Wallowa-Whitman FORPLAN model.

Purpose: To represent implementation of the recently completed Hells Canyon NRA Comprehensive Management Plan.

Rationale: This Comprehensive Management Plan was mandated by Congress. The plan followed extensive public involvement and publication of draft and final environmental impact statements.

Tradeoff: The first decade allowable sale quantity and present net value of all alternatives is reduced approximately 24 million cubic feet and 56 million dollars.

To the degree that these constraints are overlapping, the FORPLAN acreages were adjusted to account for that overlap. For example, the acres of old-growth found in riparian zone were modeled as old-growth and not included within the acres constrained to meet riparian zone objectives. The same can be said for overlap between the Starkey Experimental Forest and riparian zone, or old-growth and the Indian Creek Research Natural Area.

C. The Benchmarks

Benchmarks are analyses of data designed to provide answers to questions posed by interested parties both within and outside the Forest Service. This information is presented apart from other planning data to remind the reader that benchmarks are not alternatives. All benchmarks share the same tentatively suitable land base and an ending inventory constraint. Economics plays no part in the formulation of those benchmarks designed to maximize timber production, to maximize domestic livestock production, or in the formulation of the minimum level of management. No consideration should be given to any budgetary or efficiency data presented for those benchmarks. Economics is a consideration in those benchmarks which have as an objective function, maximization of efficiency.

The Minimum Level of Management Benchmark

This is the level of management which provides for little more than retaining the Forest in Federal ownership. The only costs incurred are those necessary for insuring public safety and environmental protection which is not associated with controllable outputs, allowing for a moderate degree of risk.

The only benefits associated with this level of activity occur in dispersed recreation, water, anadromous fish production, and a very low level of miscellaneous collections. No "close down" costs are included. The assumption is that these have been incurred in earlier times. It is also assumed that developed recreation sites and recreation special uses and sites have been closed. These include summer homes and ski areas. It is further assumed that all timber sales have either been completed or terminated and that the cost of any such termination would have already been expended. Grazing by domestic livestock will have been discontinued. There are to be no land adjustments. Roads are maintained at levels necessary to protect soil, water and safety of incidental users. The cost of road closures, however, would have been already spent in prior years. Fire suppression and insect and disease control would be limited to that necessary to prevent damage to adjacent lands of other ownership.

Identification : Minimum level of management or the minimum level benchmark
Source : 36 CFR 219.12(e)(1)(i)
Values : Market and assigned
Objective : Minimize costs
Minimum Management Requirements : Not Applicable
Harvest Control : Not Applicable
Minimum Timber Rotation : Not Applicable
Pacific Northwest Region Run Designation : Not Applicable
FORPLAN Run : Not Applicable

Maximize Efficiency Benchmark Under Nondeclining Flow -- Market Values

This benchmark estimates the maximum present net value that could be achieved by valuing market outputs only, subject to timber constraints designed to provide nondeclining flow and a minimum rotation of 95 percent of culmination of mean annual increment (CMAI).

Specific constraints were applied to protect threatened and endangered species habitat; to maintain viable populations of existing native vertebrates; to prevent significant or permanent impairment of land productivity and to maintain water quality.

Identification : Maximize efficiency under nondeclining flow (NDF) with market values only.
Source : 36 CFR 219.12(e)(1)(iii)(A)
Values : Market only
Objective : Maximize efficiency over 150 years
Minimum Management Requirements : Yes
Harvest Control : Nondeclining flow
Minimum Timber Rotation : At 95% of CMAI
Pacific Northwest Region Run Designation : 11
FORPLAN Run : 616180

Maximize Efficiency Benchmark Under Nondeclining Flow -- Market and Assigned Values

This benchmark estimates the maximum present net value that could be achieved subject to timber constraints designed to provide nondeclining flow and a minimum rotation of 95 percent of culmination of mean annual increment (CMAI).

Specific constraints were applied to protect threatened and endangered species habitat; to maintain viable populations of existing native vertebrates; to prevent significant or permanent impairment of land productivity and to maintain water quality.

Identification : Maximize efficiency under nondeclining flow NDF) with market and assigned values.
Source : 36 CFR 219.12(e)(1)(iii)(B)
Values : Market and Assigned
Objective : Maximize efficiency over 150 years
Minimum Management Requirements : Yes
Harvest Control : Nondeclining flow
Minimum Timber Rotation : At 95% of CMAI
Pacific Northwest Region Run Designation : 7
FORPLAN Run : 616180

Maximize Efficiency Benchmark Without Nondeclining Flow -- Market and Assigned Values

This benchmark estimates the maximum present net value that could be achieved by valuing market and nonmarket goods subject to certain minimum management requirements, but no nondeclining flow constraint. Sequential upper and lower bounds for timber outputs are used to provide some harvest regulation. Rotations are based on utilization standards.

Specific constraints were applied to protect threatened and endangered species habitat; to maintain viable populations of existing native vertebrates; to prevent significant or permanent impairment of land productivity; and to maintain water quality.

Identification : Maximize efficiency without nondeclining flow -- market and assigned values.
Source : 36 CFR 219.12(e)(1)(iii)(B)
Values : Market and Assigned
Objective : Maximize efficiency over 150 years
Minimum Management Requirements : Yes
Harvest Control : Sequential upper and lower bounds
Minimum Timber Rotation : Based on utilization standards
Pacific Northwest Region Run Designation : 4
FORPLAN Run : 616177

Maximize Efficiency Benchmark Without Nondeclining Flow -- Market Values Only

This benchmark estimates the maximum present net value that could be achieved using market values only, subject to certain minimum management requirements, but no nondeclining flow constraint. Sequential upper and lower bounds for timber outputs are used to provide some harvest regulation. Rotations are based on utilization standards.

Specific constraints were applied to protect threatened and endangered species habitat; to maintain viable populations of existing native vertebrates; to prevent significant or permanent impairment of land productivity; and to maintain water quality.

Identification : Maximize efficiency without nondeclining flow -- market values only.
Source : 36 CFR 219.12(e)(1)(iii)(A)
Values : Market only
Objective : Maximize efficiency over 150 years
Minimum Management Requirements : Yes
Harvest Control : Sequential upper and lower bounds
Minimum Timber Rotation : Based on utilization standards
Pacific Northwest Region Run Designation : 8
FORPLAN Run : 616177

Maximize Timber With Minimum Management Requirements

This benchmark estimates the biological potential of the Forest for timber production over the next ten years subject to nondeclining flow and minimum management requirements.

Specific constraints were applied to protect threatened and endangered species habitat; to maintain viable populations of existing native vertebrates; to prevent significant or permanent impairment of land productivity; and to maintain water quality.

Identification : Maximize Timber with minimum management requirements and nondeclining flow.
Source : 36 CFR 219.12(e)(1)(ii)
Values : Market and Assigned
Objective : Maximize timber production for ten years
Minimum Management Requirements : Yes
Harvest Control : Nondeclining flow
Minimum Timber Rotation : 95% of CMAI
Pacific Northwest Region Run Designation : 1 with MMRS
FORPLAN Run : 616070

Maximize Timber Without Minimum Management Requirements

This benchmark estimates the biological potential of the Forest for timber production over the next ten years subject to nondeclining flow without minimum management requirements. This benchmark cannot be legally implemented.

Identification : Maximize timber with nondeclining flow, but without minimum management requirements.
Source : 36 CFR 219.12(e)(1)(ii)
Values : Market and Assigned
Objective : Maximize timber production for ten years
Minimum Management Requirements : No
Harvest Control : Nondeclining flow
Minimum Timber Rotation : 95% of CMAI
Pacific Northwest Region Run Designation : 1 without MMR's
FORPLAN Run : 616082

Maximize Domestic Livestock Production

This benchmark estimates the maximum capability of the planning area to provide commercial range subject to certain legal requirements.

Specific constraints were applied to protect threatened and endangered species habitat; to maintain viable populations of existing native vertebrates; to prevent significant or permanent impairment of land productivity; and to maintain water quality.

Identification : Maximize Domestic Livestock Production
Source : 36 CFR 219.12(e)(1)(ii)
Values : Market and Assigned
Objective : Maximize domestic livestock production
Minimum Management Requirements : Yes
Harvest Control : Nondeclining flow
Minimum Timber Rotation : 95% of CMAI
Pacific Northwest Region Run Designation : None specified
FORPLAN Run : 616180

D. Benchmark Analysis

Regionally Required Runs

Numerous FORPLAN runs were made to test the apparent opportunity costs associated with various constraints representing MMR's, policy or law within the benchmarks. The runs are as follows:

Run No. 1. (FORPLAN Run 616082)

a. Dimensions:

Objective function - maximize timber (first decade)

Land base - tentatively suitable lands

Constraints -

1. Nondeclining flow (NDF) at or below long-term sustained yield (LTSY).
2. Rotations based on 95 percent of CMAI
3. Ending inventory constraints (MMR's not constraints)

b. Information provided:

1. Basis for verifying that model is reasonable in terms of timber information. The Maximize Timber FORPLAN Run No. 1 is similar to timber "RAM" runs of the mid-1970's. This run produces an average 413 million cubic feet per decade in species other than lodgepole pine over the first five decades. Timber RAM produced 395 million cubic feet per decade in "pine and associated species" from a larger acre base (979,000 acres vs 881,000 acres). The higher output from FORPLAN is achieved in spite of substantial reductions in average standing inventory volumes because of harvest, tussock moth, and pine beetle. Relatively short rotations without commercial thinning allow an aggressive harvest schedule which provides these outputs. However, these high volumes are achieved only at a high cost with net revenue* losses of 156 million dollars in the fifth decade.
2. Basis for understanding the relationship between NDF and the selection of timber management intensities and timing options.
3. Provides vehicle for all concerned parties to reach agreement on the validity of the yield tables and acreage base before additional runs are done.

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*Net Revenue: From FORPLAN, estimated High Bid Values less all related costs.

Run No. 2 (FORPLAN Run 616114)

a. Dimensions:

Objective function - maximize PNV (assigned values)

Land base - tentatively suitable lands

Constraints -

1. 20 percent sequential upper and lower bounds, 80 percent floor.
2. Rotations based solely on utilization standards (i.e., not restricted by CMAI).
3. Ending inventory constraint. (MMR's not constraints)

b. Information provided:

1. Forms a base run for evaluating the opportunity costs of harvest floors.
2. Forms a base run to use in formulating and evaluating minimum management requirements (36 CFR 219.27) see Section VI C.

Run No. 2A (FORPLAN Run 616115

a. Dimensions

Objective function: max PNV (assigned values)

Land base - tentatively suitable lands

Constraints -

1. Sequential upper and lower only (floors, ceilings not constraints)
2. Rotations based solely on utilization standards.
3. Ending inventory constraint (MMR's not constraints)

b. Information provided.

1. Compared to Run No. 2, the opportunity costs associated with the harvest floors is 3 million dollars in PNV and 11 million cubic feet in first decade allowable sale quantity (0.7 percent and 1.9 percent respectively).
2. The opportunity costs are not significant, and no additional floors were tested.

3. Floor does not need to be readjusted.

Run No. 3 (FORPLAN Run 616051)

a. Dimensions:

Objective function - max PNV (assigned values)

Land base - tentatively suitable lands

Constraints -

1. NDF
2. Rotations restricted to 95 percent of CMAI
3. Ending inventory constraint (MMR's not constraints)

b. Information provided:

1. This run in concert with Run No. 2 are base runs in analyzing MMR's.
2. When this run is compared to Run No. 2, the opportunity costs of NDF in combination with rotations restricted to CMAI are shown to be 22 million dollars in reduced PNV and 222 million cubic feet in reduced first decade allowable sale quantity, given the absence of MMR's.
3. When this run is compared to Run No. 1, the differences that result when a max PNV (assigned values) objective function is used in place of a max timber objective function is shown to be an increase in PNV of 234 million dollars and a decrease in first decade allowable sale quantity of 133 million cubic feet.

Run No. 4 - Benchmark as defined in 36 CFR 219.12(e)(1)(iii)(B). (FORPLAN RUN 616177)

a. Dimensions:

Objective function - Max PNV (assigned values)

Land base - tentatively suitable lands

Constraints -

1. Sequential upper and lower floors and ceilings as defined previously.
2. MMR's
3. Rotations based solely on utilization standards

4. Ending inventory constraint
5. Hells Canyon NRA land allocations

b. Information provided

1. Benchmark required by the regulations

2. When this run is compared to Run No. 2, the opportunity cost of the combination of MMR's, given an objective of max PNV (assigned values) and the presences of sequential upper and lower floors and ceilings and the ending inventory constraint is shown to be 184 million dollars in reduced PNV and a decrease of 296 million cubic feet in first decade allowable sale quantity.

Run No. 5 - Impact of restricting rotations to 95 percent of CMAI as required by 36 CFR 219.12(e)(1)(iii)(C) (FORPLAN Run 616178)

a. Dimensions

Objective function - max PNV (assigned values)

Land base - tentatively suitable lands

Constraints -

1. Sequential upper and lower floors and ceilings as defined in Part B

2. MMR's

3. Rotations restricted to 95 percent of CMAI

4. Ending inventory constraint

5. Hells Canyon NRA land allocations

b. Information provided:

1. When this run is compared to Run No. 4, the opportunity cost of restricting rotations to CMAI is shown to be 18 million dollars in reduced PNV and 13 million cubic feet in reduced first decade allowable sale quantity given an objective of max (PNV assigned values).

Run No. 6 - Impact of NDF as required by 36 CFR 219.12(e)(1)(iii)(C) (FORPLAN Run 616179)

a. Dimensions:

Objective function - max PNV (assigned values)

Land base - tentatively suitable lands

Constraints -

1. NDF
2. Rotations based on utilization standards
3. MMR's
4. Ending inventory constraint
5. Hells Canyon NRA land allocations

b. Information provided:

1. When this run is compared to Run No. 4, the opportunity costs of imposing NDF is shown to be 4 million dollars in reduced PNV given an objective of max PNV (assigned values). However, first decade allowable sale quantity increases by 14 million cubic feet as stands which would be economically deferred to the second decade are scheduled in the first to satisfy the NDF constraint.

Run No. 7 - Benchmark as defined in 36 CFR 219.12(e)(1)(iii)(B) (FORPLAN Run 616180)

a. Dimensions

Objective function - max PNV (assigned values)

Land base - tentatively suitable lands

Constraints -

1. NDF
2. MMR's
3. Rotations restricted to 95 percent of CMAI
4. Ending inventory constraint
5. Hells Canyon NRA land allocations

b. Information provided.

1. When compared to Run No. 6, the opportunity costs of rotations restricted to 95 percent of CMAI are shown to be 18 million dollars in reduced PNV, and 15 million cubic feet in reduced first decade ASQ, given an objective of max PNV (assigned values) and the presence of NDF, MMR's, and ending inventory constraint.

2. When compared to Run No. 5, the opportunity cost of NDF are shown to be 4 million dollars in reduced

PNV, given an objective of max PNV (assigned values) and the presence of rotations restricted to 95 percent of CMAI, MMR's, and ending inventory constraint. However, first decade allowable sale quantity is increased 12 million cubic feet.

3. When compared to Run No. 3, the opportunity costs of the combination of MMR's are shown to be 184 million dollars in reduced PNV and 75 million cubic feet in reduced first decade allowable sale quantity given an objective of max PNV (assigned values) and the presence of NDF, rotations restricted to 95 percent of CMAI and the ending inventory constraint.

4. When compared to Run No. 4, the opportunity costs of NDF in concert with rotations restricted to 95 percent of CMAI are shown to be 22 million dollars in reduced PNV and 1 million cubic feet in reduced first decade allowable sale quantity given an objective of max PNV (assigned values).

Run No. 8 - Benchmark as defined in 36 CFR 219.12(e)(1)(iii)(A). (FORPLAN Run 616177)

a. Dimensions:

Same as Run No. 4, except max PNV (market values) to the extent that prescriptions define alternative combinations of market and nonmarket priced outputs, Forest can define complementary and competitive relationships in production, as required by Item C(3) in the May 17 letter to Mr. Crowell. Runs No. 9, 10, and 11 provide similar information.

b. Information provided:

1. Benchmark required by the regulations.

2. When we compare this run to Run No. 4, we can show the difference that results from max PNV (assigned values) and max PNV (market values).

Run No. 9 - Impacts of restricting rotations to 95 percent of CMAI as required by 36 CFR 219.12(e)(1)(iii)(C) (FORPLAN Run 616178)

a. Dimensions:

Same as Run No. 5, except max PNV (market values)

b. Information provided:

1. When compared to Run No. 8, Forests can show the opportunity costs of restricting rotations to 95 percent of CMAI given an objective of max PNV

(market values) and given the presence of sequential upper and lower floors and ceilings, MMR's, and the ending inventory constraint.

2. When compared to Run No. 5, Forests can show differences that result from the max PNV (assigned values) and max PNV (market values).

Run No. 10 - Impact of NDF as required by 36 CFR 219.12(e)(1)(iii)(C). FORPLAN Run 616179)

a. Dimensions:

Same as Run No. 6, except max PNV (market values).

b. Information provided:

1. When compared to Run No. 8, Forests can show the opportunity costs of NDF given an objective of max PNV (market values) and given the presence of rotations based on utilization standards, MMR's, and the ending inventory constraint.

2. When compared to Run No. 6, Forests can show differences that result from max PNV (assigned values) and max PNV (market values).

Run No. 11 - Benchmark as defined in 36 CFR 219.12(e)(1)(iii)(A). (FORPLAN Run 616180)

a. Dimensions:

Same as Run No. 7 except max PNV (market values)

b. Information provided:

1. When compared to Run No. 10, Forests can show the opportunity costs of restricting rotations to 95 percent of CMAI given an objective of max PNV (market values) and given the presence of NDF, MMR's, and ending inventory constraints.

2. When compared to Run No. 9, Forests can show the opportunity costs of NDF given an objective of max PNV (market values) and given the presence of MMR's, ending inventory constraint, and rotations restricted to 95 percent of CMAI).

3. When compared to Run No. 7, Forests can show the differences that result from max PNV (assigned values) and max PNV (market values).

Table B-20 summarizes some of the Regionally required benchmark runs and sensitivity tests.

Table B-20
ADDITIONAL FORPLAN ANALYSIS PER REGIONAL DIRECTION, NOVEMBER 10, 1983

FORPLAN RUN REGION IDENTIFICATION	1/ OBJ	CONSTRAINTS						2/ PNW TBR MM$	DECADE NET REVENUE 3/ (MM$ OF TMBR RCPT)			ACRES TIMBER MGMT (M AC)	FIRST DECADE HRVST MMCF	LRSY MMCF
						ROTATION								
		MMR	END INV	SEQ U&L	NDF	UTIL STDS	0.95 CMAI		HIGH	LOW	TOTAL FIVE			
RUN #1 4/	TBR/PNW		X		X		X	200	232	-156	223	1072	479	554
MAX TIMBER BENCHMARK	TBR/PNW	X	X		X		X	86	138	-98	153	950	391	453
RUN #2 4/	PNW		X	X		X		456	384	48	719	949	568	285
RUN #2A (NO HARVEST FLOOR)	PNW		X	X		X		458	392	36	724	949	579	270
RUN #3 4/	PNW		X		X		X	434	271	18	773	997	346	381
RUN #4	PNW	X	X	X		X		272	179	73	593	846	272	268
RUN #5	PNW	X	X	X			X	254	167	44	559	819	259	251
RUN #6	PNW	X	X		X	X		268	156	60	570	856	286	288
RUN #7	PNW	X	X		X		X	250	147	76	524	823	271	286
RUN #7 WITHOUT HCNRA CMP	PNW	X	X		X		X	306	173	84	652	900	295	310
RUN #7 WITH MMRS ONLY	PNW	X	X		X		X	345	208	81	706	925	308	326
RUN #7 WITHOUT HARVEST DISP AND 10% COVER BGWR	PNW	X	X		X		X	411	261	10	728	966	327	362
RUN #3 WITH 0% PRICE TREND	PNW		X		X		X	336	253	-12	546	997	314	344
RUN #3 WITH 2% PRICE TREND	PNW		X		X		X	579	299	98	1143	997	352	384
RUN #3 WITH 3% PRICE TREND	PNW		X		X		X	801	797	163	1886	1033	230	469
RUN #3 WITH 50% REDUCTION IN PLANTING COSTS	PNW		X		X		X	435	270	75	771	997	350	383
RUN #3 WITH 20% REDUCTION IN "SALE PREP" COSTS	PNW		X		X		X	466	288	42	834	997	349	384

1/ Objective of FORPLAN run: "PNW" means maximize PNW under specified condition set.
"TBR/PNW" means maximize PNW under specified condition set which includes a timber target set at 99% of the maximum possible first decade timber production.

2/ PNW from FORPLAN, timber program only (150 years).

3/ Revenues in excess of expenditures as tracked in FORPLAN.

4/ Runs #1, 2, 2A, and 3 include 90,156 acres of Forest in Hells Canyon NRA which are not available for scheduled timber harvest in any alternative. Removing these acres from these benchmark runs would reduce first decade timber yield in Run #1 by approximately 40 MMCF, and PNW of Runs #2 and 3 by approximately 95 million dollars.

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The tradeoff costs associated with minimum management requirements, culmination of mean annual increment, and harvest flow constraints are summarized in Table B-21. The apparent dollar costs of the harvest flow and harvest dispersion constraints are disproportionately greater than the opportunity costs expressed in cubic foot output of timber, because both types of constraints tend to limit the amount of the high value, low cost stands which can be harvested in the first decade. The cost of harvest dispersion, expressed as a change in five-decade net revenues, is substantially less than the change in PNV because many of these stands are subsequently scheduled in the second, third, and fourth decades.

All benchmarks and alternatives which are subject to harvest flow constraints have those constraints applied to the Wallowa-Whitman National Forest as an administrative unit. Non-declining evenflow is thus achieved (where applicable) for the Wallowa-Whitman National Forest as an administrative unit. This unit includes all of the Wallowa, all of the Whitman, and portions of the Nezperce and Payette proclaimed National Forests.

The Nezperce encompasses only 12,000 acres of technically suitable forest land, of which less than 1,000 acres were found economically efficient in the maximize PNV benchmark. The contributions of the Nezperce to the Wallowa-Whitman harvest schedule are insignificant. The Payette National Forest contributes no acreage to the suitable and economically efficient timber base (being nearly all wilderness or wild river). Its contribution to the annual allowable sale quantity is nil.

The Wallowa and Whitman proclaimed National Forests each encompass far more than 200,000 acres of suitable and economically efficient forest land and both contribute substantial volumes to the annual allowable sale quantity. While nondeclining evenflow is satisfied on the administrative area, harvest flow as disaggregated to the proclaimed National Forests (Figure B-1) fluctuates irregularly from decade to decade.

This fluctuation can be regarded as a departure from the base sale schedule for each of the proclaimed Forests. No base sale schedule has been calculated for them. All resource objectives have been established for the Wallowa-Whitman National Forest as a single administrative entity. Most publics recognize the Wallowa-Whitman as a single entity and it therefore is appropriate to establish nondeclining evenflow at that level.

Relationship Between Market and Nonmarket Outputs of Maximum PNV Benchmarks

Run No. 8 through Run No. 11 shared the same FORPLAN base as Run No. 4 through Run No. 7. Assigned values proved insufficient to require iterative running of FORPLAN. Therefore, expected output of market and nonmarket goods is the same in the market only and assigned values benchmarks.

Table B-21

CHANGES RESULTING FROM MINIMUM MANAGEMENT REQUIREMENTS, CULMINATION OF MEAN ANNUAL INCREMENT AND NONDECLINING EVENFLOW CONSTRAINTS.

Constraint Description	Change in PNW MM$	Change in 5 Decade Net Rev MM$ 1/	Change in 1ST Decade Timber MMCF 2/	Change in LRSY MMCF
Starting Point: Run 2A	458	724	579	270
Harvest Floor	- 2	- 5	- 11	+ 15
MMRS--Total 3/				
with NDEF,CMAI	-184	-249	- 75	- 95
without NDEF,CMAI	-184	-126	-296	- 17
MMRS--Individual 3/				
Old-growth and riparian	- 23	- 45	- 19	- 19
Harv disp and thrml bgwr	- 66	- 22	- 19	- 36
HCNRA Act	- 39	- 54	- 13	- 16
HCNRA Comp Mgt PlanN	- 56	-128	- 24	- 24
Rotations at 0.95 CMAI				
with nondeclining flow	- 18	- 46	- 15	- 2
without NDEF	- 18	- 34	- 13	- 17
Nondeclining Evenflow				
with 0.95 CMAI	- 4	- 35	+ 12	+ 35
without 0.95 CMAI	- 4	- 23	+ 14	+ 20
NDEF and 0.95 CMAI Total				
with MMR's	- 22	- 69	+ 1	- 18
without MMR's	+ 22	- 54	+222	- 96

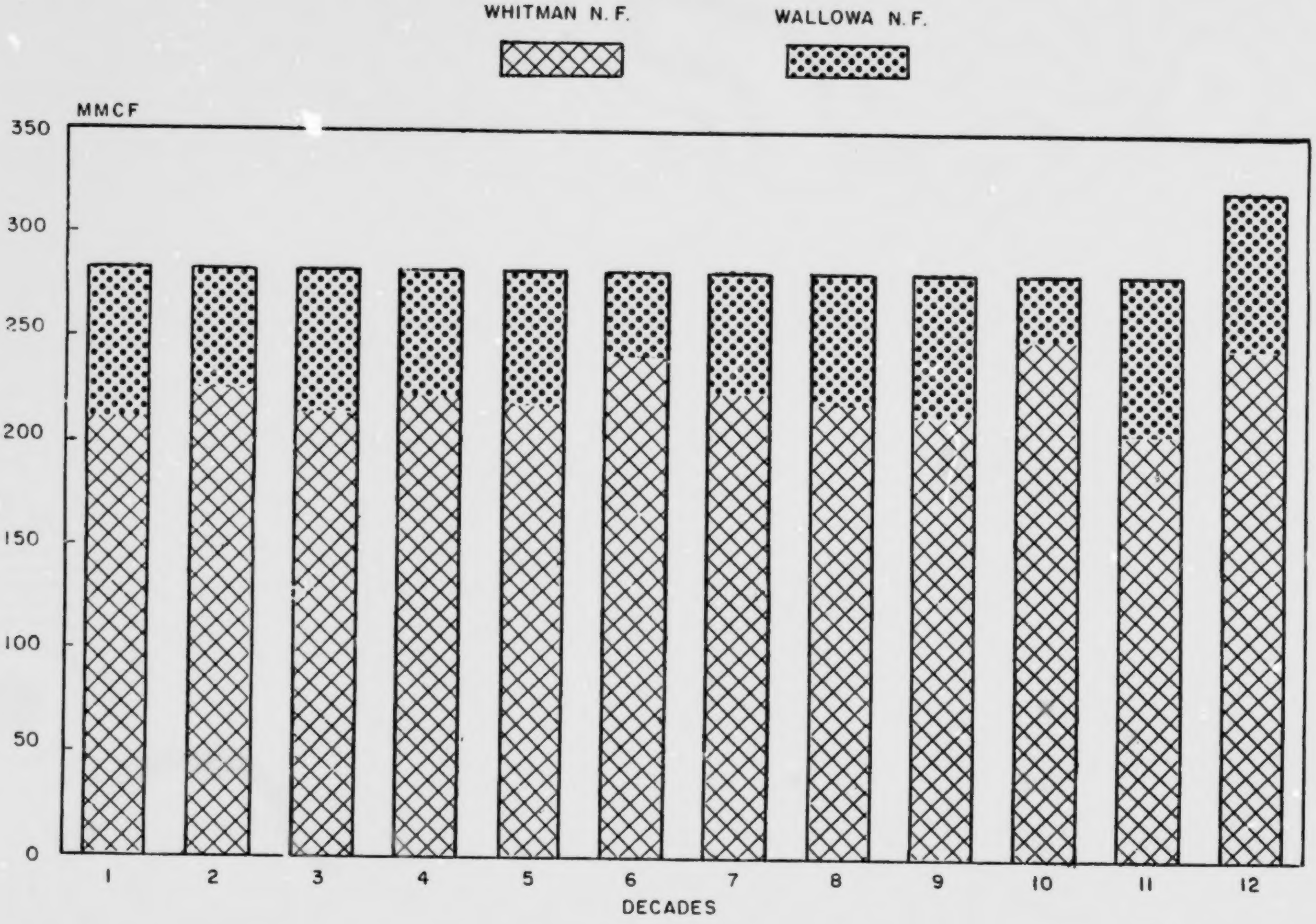
1/ Timber receipts in excess of timber costs from FORPLAN--not discounted. Figures shown are for the first five decades.

2/ Changes shown are for the first decade. Annual figures would be one-tenth those shown.

3/ Changes in individual MMR's do not equal the totals due to overlap.

Figure B-1

NDEF AND HARVEST FLOW FROM PROCLAIMED NATIONAL FORESTS



Summary of Benchmark Results

Table II-3c, Chapter II summarizes acreage by prescription assignments, resource outputs, and effects of benchmarks. Table B-22 summarizes PNV, total discounted costs and total discounted benefits for benchmarks.

E. Uncertainty in the Analysis

Nearly all data used in Forest planning are average (arithmetic mean) values or are derived from averages. This use of averages to represent the Forest is necessary because it would be impracticable to physically collect precise data on every acre of a 2.3 million acre Forest in a timely manner. Even if it were possible, each acre would be represented as an average situation. The use of averages means that some areas of the Forest will have their costs or benefits or other characteristics substantially overstated or understated. Thus a decision to manage or not manage timber on a certain land type based on averages is not always correct. That is one reason why we are required to do project level analysis. An example bordering on the ludicrous would use Forest-wide averages for standing volume of timber, the cost of logging, the value of species, and future growth potential. Such gross averaging would mask the very differences which the analysis is supposed to identify and consider.

To minimize this problem, the Forest has been stratified into capability areas which describe potential growth, value of species, cost of logging, and other characteristics which are relevant to the decision making process. These are further disaggregated into analysis areas (Section III, this appendix) to provide more specific information about existing stand conditions and potentials for growth on those existing stands and the stands that will succeed them. The detail of this stratification approaches the limits of practicality for assembling and analyzing data. We have taken the opportunity to be more specific within our analysis whenever it was practical. As an example, logging haul costs for the Hells Canyon National Recreation Area are significantly higher than the average expected for the rest of the Wallowa-Whitman National Forest.

Our intent in identifying the HCNRA in the Forest model was to be able to answer questions about it. At the time the model was constructed, the decision on the HCNRA CMP (Comprehensive Management Plan) was being held in abeyance. There was reason to identify the HCNRA as a distinct unit so that if changes were made in the HCNRA CMP, they could be accommodated in the model. Even today there is movement afoot to legislatively establish the harvest level for the HCNRA. There seems to be no reason to think interest in the HCNRA as a distinct entity will soon diminish.

FORPLAN runs have been made to respond to anticipated queries regarding the cost of implementing the CMP. Differences in stumpage values for the HCNRA are reflected in the HCNRA's working group mix. The HCNRA's incidence of high valued stands is therefore reflected in the model.

Because the HCNRA was geographically identified within the FORPLAN model, we used the more specific haul and road maintenance costs for the HCNRA rather than simply applying Forest-wide average haul and road maintenance costs. It would have been desirable to have had even greater geographic specificity in haul costs with our FORPLAN model for the entire Forest. This might have resulted in different decisions on certain portions of the Forest. However, it proved to be impractical because of model size limitations to incorporate that level of geographic specificity in the model. The fact that geographically-specific haul and road maintenance costs could not be included in the FORPLAN model for all Forest areas does not obviate the need to track significant haul and road maintenance cost differences, where possible, as in the case of the HCNRA.

Another area of uncertainty is that which rises in making projections into the future. This includes such things as the growth rates of timber, anticipated trends in recreation use, or in the values stated for recreation and timber. By definition all projections into the future are extrapolations beyond known data points. The farther the projection is extended, the greater the uncertainty becomes.

Our assumptions regarding future timber prices and other questions as to the adequacy of our data have been subjected to sensitivity tests. A sensitivity test attempts to answer "what if" questions. What if our projected price trends for timber are overstated or understated in our FORPLAN model, for instance? Would the results change significantly?

If disproportionately large changes occur from relatively small changes in an input datum, the model would be said to be highly sensitive to that bit of input. If on the other hand, large changes could be made in that input with little or no change in the model's output, then we would deduce that the model was relatively insensitive to that input. Sensitivity tests thus can be used to show areas in which more precision is needed relative to others.

Some sensitivity testing is obvious, if not intuitive. For instance, logic tells us that the model will be more sensitive to changes in an assigned cost of $200 per acre than to changes in an assigned cost of $20 per acre and that much more effort should be expended in looking into the former. Likewise, relatively less effort need be spent on costs and benefits which can change little between alternatives because they will not loom that great in the decisionmaking process. That is, the rankings of the alternatives would not be affected.

In way of illustration, FORPLAN was run several times with different price trends for timber. The rate of increase assumed in the alternatives is 1 percent compounded annually for 50 years. The sensitivity tests were run at 0 percent, 2 percent, and 3 percent, all compounded annually. In addition, the costs of "sale preparation"* and planting were also varied significantly in other sensitivity tests are from the costs used for the alternatives. The results of these sensitivity tests are presented as part of Table B-20. None of the tests indicated unacceptable risk of decision error from reasonably anticipated variations in costs or trends.

Another significant area of uncertainty involves the Forest's distribution of long-span and helicopter ground. These lands have been grouped together for analysis in this planning process. No specific mapping has been done on these areas to identify which can be accessed by long-span cable logging systems and those which will need to be logged with helicopters or other aerial appliances. This question is significant because helicopter logging is much more expensive than is long-span logging. The best estimates are that 75 percent of the lands so categorized outside the HCNRA could be harvested with long-span equipment, the balance being accomplished by helicopter. Inside the HCNRA, the percentages are reversed.

Because of the significant cost differential between these two modes of operation, the use of these averages may have altered the outcome of the model. The exact distribution, however, will not be known unless and until these lands are actually layed out for timber sale--at which time the logging system will be identified.

Some observations can, however, be made. Most noteworthy is the fact that regardless of the exact distribution, helicopter logging is the most costly system identified on the Forest and thus would always be selected last and least for harvesting. Because of its costliness it is scheduled later for harvesting when its cost disadvantage can be discounted.

The sensitivity of the model to this question has been addressed indirectly in the sensitivity tests of cost differences and (even more indirectly) through the price increase sensitivity test. We can say that a price sensitivity test provides insight because the model does not differentiate between an increase in benefits and a decrease in costs. Its objective, after all, is to maximize the excess of benefits over costs. Those sensitivity tests, detailed in Table B-20, tend to indicate that the percentage distribution between long span and helicopter logging could be substantially off without causing disruptive shifts in model outcome. This is partly due to the fact that only Alternative G is run without a timber target. All others have sacrificed significantly with regards to efficiency in order to meet timber targets and have, therefore, presumably moved more heavily into these aerial systems than would have otherwise been the case.

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*Sale preparation as used here refers to a cost center including a wide array of costs in support of the timber program.

Forest historical data is not free from uncertainty. The Management Attainment Reporting Systems (MARS), for instance, is used to record Forest achievements. Live Timber Offerings are included in MARS Code 17.1; Mortality Offerings in 17.2. Historically, the Forest has reported merchantable endemic tree mortality as Live Timber Offerings. This is understandable because the material can be processed like live sawtimber. Strictly speaking, however, the material should be included in mortality offerings. This causes concern when comparing future FORPLAN empiric yields (which exclude all mortality volume, no matter how recent the mortality or how valuable the timber) with historical Live Timber Offerings which include merchantable endemic mortality volume.

The amount of mortality volume included is not known, nor can it be retrieved from Forest records which were not set up to track this data for future recall. Using Forest inventory statistics, it appears reasonable to assume that there would be an additional 2.6 percent sawtimber volume harvested in any alternative in any time period. This would be merchantable endemic mortality sawtimber. Depending on market conditions, additional mortality volume might be offerred in the form of mortality salvage sales. Figures shown in this document for the alternatives track these volumes as roundwood.

Estimates of jobs, personal income, and payments to local governments also have a high degree of uncertainty. All three rely on all the base data used to generate timber yields, recreation use, and the like and therefore share all the uncertainty implicit in those estimates. Beyond those concerns, jobs and personal income estimates are necessarily approximate in that they rely on the IMPLAN Model which uses 1972 average technological coefficients. Payments to local governments are primarily a function of Forest stumpage values--values which can be modified through changes in the appraisal process, the period allowed a contractor for harvesting the timber, etc.

During the course of the analysis, it became apparent that every alternative would fail to provide to some degree semiprimitive motorized, primitive, and rural recreation opportunities (as identified in the Recreation Opportunity Spectrum--ROS). In the case of primitive recreation opportunties, it was reasoned that those seeking primitive recreation experiences would be content to find them in land identified as being wilderness-primitive. This is because the only difference between the primitive and the wilderness-primitive categories is that the latter has been officially designated as wilderness.

Our assumption in the case of semiprimitive motorized experience was that those who use that land would continue to do so when it became roaded natural or that those who ceased using it would be replaced by others. Some argue that this would not occur--that that group of recreationists would simply be lost to the Forest. We decided otherwise because the deficits don't begin occurring until some 20 years in the future; because recreationists' views of the world and their recreational opportunities will have changed; and because much alternative off-Forest semiprimitive recreation opportunities will no longer exist.

We have also assumed that there will be movement into the roaded natural grouping from the rural category as well as from the semiprimitive ROS category.

Some may argue that, because of the above described uncertainties and attendant, risk of error, the data used in this analysis process are inadequate for making any decision at all. However, such a position ignores the fact that continuance under old plans, themselves not without fault, constitutes a decision. One can always seek better data and indeed the provisions for monitoring this plan are established largely in order to improve the data for decision making in future plans. Existing plans are based upon much less specific data and, therefore, assume greater risk of error than is represented within this DEIS and proposed Forest Plan. Therefore, the most prudent course of action in confronting this risk is to acknowledge that there is considerable uncertainty in much of our data, but assert that the data are adequate for this decision and are better than the data upon which previous decisions have been made.

VII. FORMULATION OF ALTERNATIVES

A. Overview

A Forest Plan alternative is a mix of management prescriptions applied in specific amounts and locations of the Forest to achieve a desired management goal and objectives. According to NFMA (36 CFR 219.12(f) alternatives must:

-- Be within the maximum and minimum resource potential of the Forest to provide a full range of major commodity and environmental resource uses and values that could be produced from the Forest.

-- Be formulated to facilitate analysis of opportunity costs, resource use, and environmental tradeoffs among alternatives.

-- Be formulated to facilitate evaluation of present net value, benefits, and costs of achieving various outputs and nonpriced benefits.

-- Address and respond differently to major public issues, management concerns, and resource opportunities.

-- Represent the most cost-efficient combination of management prescriptions to meet the objectives of the alternative.

-- State the condition and uses that will result from long-term implementation.

-- State what goods and services will be produced, including timing and flow of outputs, and the costs and benefits generated.

-- State the resource management standards and guidelines.

-- State the purposes of the proposed management direction.

Formulation of alternatives, planning step five, followed the analysis of the management situation. Benchmarks from this analysis defined the range within which alternatives were developed. In addition, six alternatives were required by the Chief, USDA Forest Service or by the Regional Forester: one which responds to the RPA Program targets; one which meets the State of Oregon Forestry Program for Oregon (FPFO) targets; one which reflects current and future level of goods and services if current management was continued (the no-action alternative); one that emphasizes high market opportunities; one that emphasizes high nonmarket opportunities; and one that emphasizes undeveloped lands in an undeveloped state. The following is a listing of the planning actions involved in the process of analyzing and evaluating alternatives:

Step 1. Major public issues, management concerns, and opportunities were identified through public and internal meetings and Forest Plan Reports. The Issues, Concerns, and Opportunities were consolidated and treated as though they were one and the same. What was an issue to some people was viewed as an opportunity by others and may have been a concern to the Forest. Unroaded lands is an example. They are an issue because of the question of how to manage them, yet there are opportunities to use them for undeveloped recreation or for the development of geothermal resources. They are a concern to the Forest Service because we need to establish some stable and long-term management direction for these areas.

Step 2. A comprehensive multi-resource data base was formed based on the identified issues and concerns and stored on overlays and in computer "flat files."

Step 3. Analysis areas which represent similar physical and biological attributes were identified and mapped. The capability, suitability, and management opportunities of specific areas of the Forest were considered in this step.

Step 4. A set of management prescriptions was prepared to represent a variety of possible ways and intensities to manage the Forest.

Step 5. The 355 analysis areas identified in Step 3 were assigned management prescriptions. Some analysis areas were assigned only one prescription while others were given the opportunity to select from a variety of prescriptions. Single prescription assignments limit the model's choices to either applying or not applying the prescription.

Step 6. Resource outputs and the associated costs and dollar values that would result when a prescription was implemented were calculated and entered into the computer model FORPLAN.

Step 7. Demand was estimated for those resources which were identified as issues.

Step 8. During the analysis of the management situation, supply potentials were determined using the FORPLAN computer model and other techniques. Various assumptions, constraints, and objectives were used to establish benchmarks for supply potentials of each resource. A benchmark was established for maximum present net value. Existing resource supply and projected demand was compared. Opportunities to resolve issues and management concerns were explored by comparing existing and projected demand to potential production levels. These potentials, when compared to the current direction benchmark, indicate opportunities and/or the need for change. This step concluded the analysis of the management situation.

Step 9. Alternatives were developed to provide a broad range of options for future management of the Forest in response to issues and concerns. A goal or goals associated with each issue and its related management concerns were identified by the Interdisciplinary Planning Team. These goals were further refined into factors which could be used for comparing alternatives. These goals and comparative factors are described below. For a detailed description of major issues and concerns, see Chapter 1, this DEIS.

Issue: Timber Production

Goal - Maintain or increase timber production.

Comparative Factor - Projected annual timber production in the first decade.

Issue: Transportation System Management

Goal - Minimize new road construction.

Comparative Factor - Miles of road existing after the first decade.

Issue: Management of Undeveloped Areas

Goal - Retain existing undeveloped area.

Comparative Factor - Acres of undeveloped area remaining after two decades.

Issue: Local Economy

Goal - Maintain economic stability of local communities.

Comparative Factor - First decade jobs.
- First decade personal income.
- First decade payment to counties.

Issue: Recreation Diversity

Goal - Maintain or enhance the diversity of recreational opportunities.

Comparative Factor - Acres by Recreation Opportunity Spectrum (ROS) class.

Issue: Livestock Production

Goal - Maintain or increase forage available to domestic livestock.

Comparative Factor - Animal Unit Months (AUM's) of forage allocated to use by livestock.

Issue: Old-Growth Timber

Goal - Maintain existing old-growth.

Comparative Factor - Acres meeting Regional old-growth definition.

Issue: Minerals

Goal - Maximize opportunities for mineral exploration and extraction.

Comparative Factor - Acres of known mineral potential available for mineral entry.

Issue: Wildife Habitat - Deer and Elk

Goal - Provide optimum big game habitat across the Forest.

Comparative Factor - Habitat effectiveness compared to current.

Each alternative emphasizes one or more of the issue goals. The issue goals represent the means for addressing the planning question raised by the issue, and are met by combinations of management prescriptions selected in the formulation of each alternative.

B. Role of Economics Within Alternative Formulations

Economics played an important role in selecting the mix of timber management intensities which were available within each alternative. In advance of FORPLAN runs, an exhaustive review was made of alternative silvicultural practices considering the many possible combinations of reforestation method, precommercial thinning, commercial thinning, regeneration, and rotation length. In this review the number of prescription possibilities was reduced from over 100 to approximately 15 which were carried forward into the FORPLAN model. These figures are exclusive of the great number of permutations which result from the various possible rotation lengths. Cost efficiency was considered including and excluding existing inventories; for both single rotations and perpetual rotations; with and without real price increases; with and without thinning slash treatment; and for a wide range of rotation lengths. The potential for producing timber volume was also considered. This process is more completely described in Appendix B, Section IV.

The full range of management intensities carried forward into FORPLAN was allowed in all alternatives. Within the issue-related constraints specified for the desired Forest conditions of each alternative, the full range of these management intensities and the possibility of a decision to not manage for timber production was included. Therefore FORPLAN solutions provide the most cost-efficient means of achieving the desired future conditions within each alternative.

Translating these desired conditions into FORPLAN constraints allowed for the coordination of many Forest resources as an integrated mix. There are additional outputs and costs, however, which were not included in the FORPLAN model. They were included in a spreadsheet analysis. This analysis incorporated all benefits and costs into a single economic efficiency analysis, and provided the overall present net value statements for each alternative.

The FORPLAN model was used to estimate the outputs and costs for each alternative by reflecting the objective of the alternative through a given set of constraints. FORPLAN prescriptions (including constraints) approximating the desired Forest conditions were developed considering the mix of issue goals emphasized by each alternative. The starting point was Benchmark 7, because it contained the basic constraint set needed to meet minimum management requirements.

FORPLAN was used to select the combination of prescriptions and harvest schedule in each alternative which maximizes present net value, given the alternative goals and constraints. A detailed description of how FORPLAN computer runs were formulated is found in Section III of this appendix. All alternatives were modeled in FORPLAN. Constraints applied to each alternative are discussed in detail in this section.

Several alternatives were run under both maximize present net worth and maximize timber objective functions, and then iteratively run with various percentages of the maximum timber level for that alternative set as a minimum timber output constraint. Table B-23 displays the relationship between present net worth and timber outputs, and timber investments. Increased timber outputs require increased investments in planting and precommercial thinning, and increased harvest of economically marginal lands. These relationships are curvilinear rather than linear (Figure B-2) with the last increment of timber output costing a disproportionately large reduction in present net worth. Conversely, the last increment in present net worth causes a disproportionately large reduction in timber outputs. This relationship makes selecting an alternative more difficult as there is considerable overlap between potential timber outputs from substantially different land allocations. These tradeoffs are further illustrated within the alternatives we have selected for detailed analysis.

C. Common Constraints

Some constraints and prescriptions were common to all the alternatives. These were necessary to meet some planning requirements, to meet existing law or policy, or to meet the objectives of prescriptions.

Table B-22
DISCOUNTED BENEFITS, DISCOUNTED COSTS AND PRESENT NET VALUE OF BENCHMARKS
(1982 MM$)

COST, BENEFIT OR PNV	Minimum Level	Max PNV Run 11	Max PNV Run 7	Max PNV Run 4	Max PNV Run 8	Max Timber W/ MMR'S 1/	Max Timber W/O MMR's 1/	Max Livestock	Max Elk
Total Discounted Benefits	232	505	1102	1138	541	1071	1242	1106	997
Total Discounted Costs	108	433	433	450	450	709	822	435	411
Present Net Value	125	72	669	688	91	362	420	671	586

1/ For this comparison maximize timber / maximize PNV "rollover" runs were not used to represent the max timber benchmarks. Therefore the present net values derived are not comparable to present net values of the other benchmarks.

Figure B-2

PNV VS TIMBER

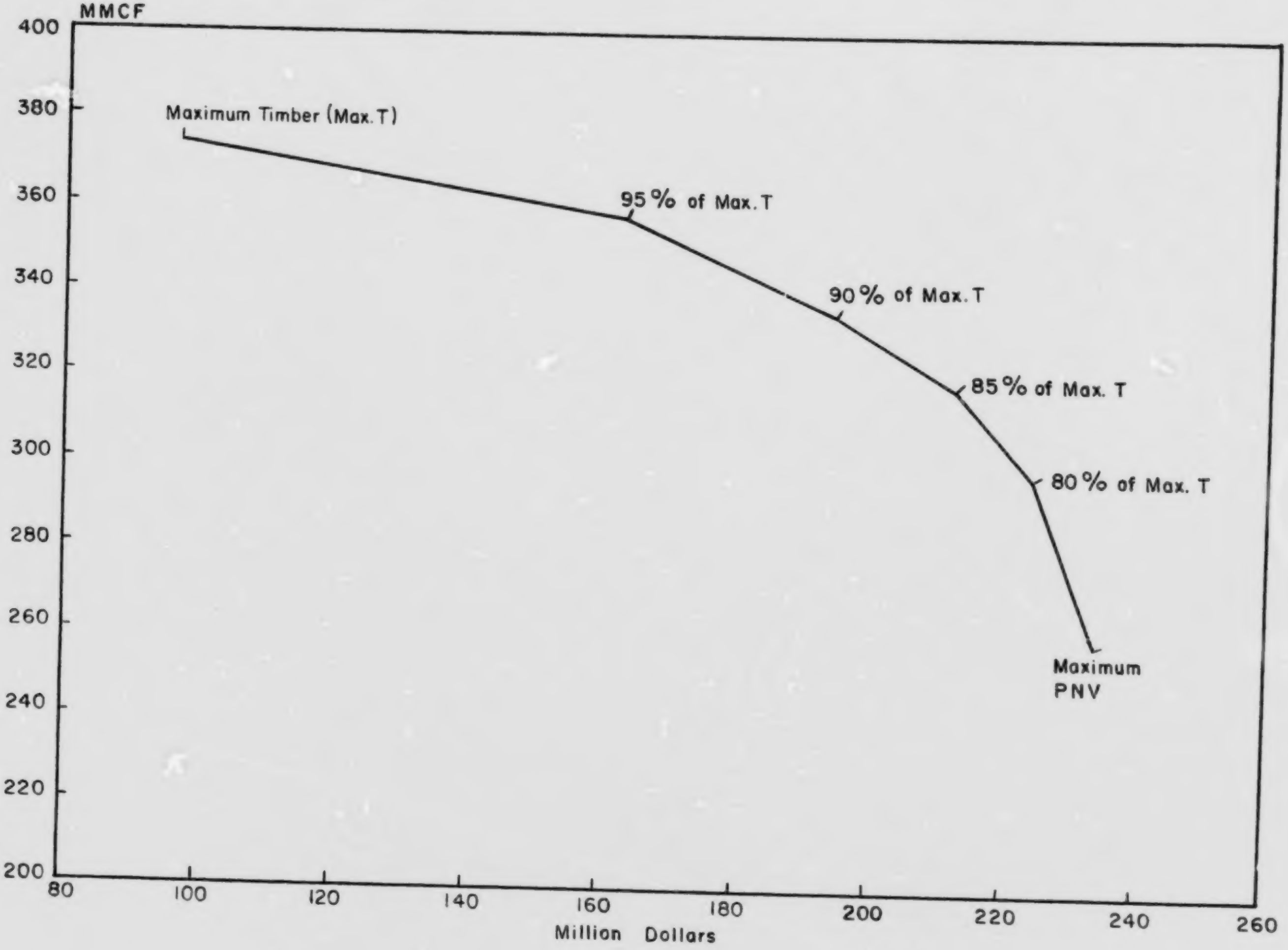

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Table B-23
PRESENT NET VALUE, TIMBER OUTPUTS AND TIMBER ACTIVITIES

Objective	PNV* MM$/ 150	MMCF /YR	MMBF /YR	TM Acres	First Decade Logging Systems (M AC) TRCTR	SKLYN	HL/LS	Fourth Decade Logging Systems (M AC) TRCTR	SKYLN	HL/LS	First DEC Cul Treat (M AC/YR) Plant	PRECOM	TMBR BDGT MM$/YR
MAX PNV 0.70 MAX T	232	25.9	128	810	14.8	2.2	0.1	8.1	8.7	1.6	4.6	4.9	8.5
MAX PNV 0.80 MAX T	222	30.0	149	851	15.7	3.6	0.1	7.5	11.7	3.1	5.3	6.5	10.2
MAX PNV 0.85 MAX T	212	31.9	158	875	17.7	4.0	0.1	6.0	13.5	3.3	5.7	7.8	11.3
MAX PNV 0.90 MAX T	192	33.8	167	898	17.9	4.8	0.3	8.3	14.6	3.3	6.4	9.4	12.4
MAX PNV 0.95 MAX T	159	35.7	174	911	18.8	5.5	0.7	7.2	14.8	3.9	8.5	12.2	14.0
MAX PNV 0.99 MAX T	96	37.2	180	932	17.3	8.6	2.0	13.0	10.1	3.8	13.1	12.3	16.5

* Economic data from FORPLAN, exclusive of nontimber considerations.

The constraints listed under the benchmark discussion in Section VI above are common to all alternatives except as superseded by more specific constraints. Several additional constraints are also common to all alternatives. They are:

1. Constraint: No scheduled timber harvest was allowed for the Anthony Lakes Ski and summer home area or in other developed recreation sites (Management Strategy 16).

   Purpose: To assure continuation of the current level of developed recreation opportunity, particularly that high-valued opportunity associated with the Anthony Lakes Ski Area and summer home area.

   Rationale: Many dollars have been invested in the development of the Anthony Lakes Ski Area and summer home area. This area provides substantial benefit to the local economy in terms of recreation visitor days, as well as the annual use fees to the Forest Service.

   Tradeoff: This constraint may actually increase the present net value over what would be experienced if clearcutting were allowed on a scheduled basis within these recreation areas. The PNV associated with visitor days at Anthony Lakes Ski Area is approximately 4.0 million dollars vs approximately 1.2 million dollars in timber production foregone. The actual cost in terms of lost recreation visitor days associated with timber harvest on a scheduled basis in these areas would be difficult to estimate. As example, portions of the ski area could be clearcut and skiers would only find an additional run, but cutting large portions of the area would degrade the recreation experience.

2. Constraint: Selection harvest only was provided for the Phillips Lake Recreation Area. (Management Strategy 5)

   Purpose: To comply with the agreement between the Forest Service and the Bureau of Reclamation to manage this area emphasizing recreation around Phillips Lake.

   Rationale: The model would otherwise schedule large blocks of this area to be clearcut or shelterwood cut within the next several decades. Selection harvest was chosen as the most effective way to represent protection of the highly sensitive visual foreground and recreation opportunity in this area. Dominance of pure ponderosa pine stands lend themselves to selection and group selection management.

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Tradeoff: The first decade allowable sale quantity and present net value of all alternatives are reduced approximately 0.3 million cubic feet and 0.4 million dollars as a result of selection harvest.

D. The Development of Alternatives Considered in Detail

Alternative A

This alternative represents continued implementation of management direction provided by the six existing land management (unit) plans, including the management plan for the Hells Canyon National Recreation Area. The intent of this alternative is to provide an estimate of the activities likely to appear if the management were to continue under direction found in the unit plans. It also serves as standard of comparison for evaluating the other alternatives. To make this alternative consistent and comparable to the other alternatives, current resource yield tables are used along with the most recent inventory information. This includes current timber inventory information and improved data on the suitability of land for timber production. Only National Forest Management Act requirements that are part of current direction as established in unit plans are incorporated into this alternative.

In this alternative, the total Forest budget is constrained to the average budget during the period 1980 to 1983, updated to 1982 dollars and adjusted for inflation in future years. The proportion of the Forest budget expended by various functions (such as timber, range, or recreation) varies depending on the level of outputs being provided. Within this budget, output and activity levels projected by the unit plans and resource management plans are managed as closely as possible.

The intensive wood/forage management strategy is represented in FORPLAN with only minimum harvest dispersion constraints applied (represented as Management Strategy 1). The optimum wood-big game strategy is represented in its alternative or in FORPLAN by Management Strategy 3. The low investment timber management and the quality hunt/critical cover management of the current unit plans is also represented by Management Strategy 3, constrained by prescription to natural regeneration and harvest only. This constraint applies to approximately 289,000 acres and is set as a proportion of each analysis area in Management Strategy 3 that must go to the natural regeneration and harvest-only management intensity. This constraint represents direction in the existing unit plans to not plant or precommercial thin acres of timber within these allocations.

Alternative B

This alternative was formulated with the primary emphasis on issue goals for timber, livestock, and the local economy. This alternative is the RPA alternative and attempts to provide outputs and activities as assigned to each Forest through National and

Regional planning. RPA targets for recreation, timber, livestock, anadromous fisheries, and forage are met; targets for wildlife improvement are not. Implementation of this alternative would result in 1.26 million acres of the Forest being intensively managed for timber and forage and having a highly developed road system. Compared with Alternative A, this alternative represents a marked increase in emphasis on commodity outputs. Major differences from Alternative A include significantly reduced emphasis on providing big-game cover, both on summer ranges and winter ranges, a reduced level of old-growth timber (though it would be better distributed across the Forest), fewer opportunities for primitive and semi-primitive recreation, reduced water quality, and more intensive timber management within the three domestic supply watersheds.

This alternative is a small increment toward a commodity/amenity blend from the max present net value and max timber benchmarks. Two constraints only are added to the benchmark and other resource constraints common to all alternatives. A third added constraint was to achieve a higher timber output. They are:

1. Constraint: 23,000 acres of highly sensitive visual foregrounds are constrained to selection harvest only.

   Purpose: Provide for maintenance of high scenic quality along highly sensitive travel routes.

   Rationale: The maintenance of visual quality requires distribution of age classes which would be approximated by a rate of regeneration of harvest constraint not to exceed 4 percent per decade. The incorporation of selection harvest yield tables approximates a similar management on a group selection basis.

   Tradeoff: The decadal allowable sale quantity and fifteen decade present net value are reduced approximately 4.2 million cubic feet and 4.9 million dollars respectively.

2. Constraint: Management Strategy 2 was applied across all big-game winter ranges outside of Hells Canyon National Recreation Area and Wilderness.

   Purpose: To maintain more effective deer and elk cover on big-game winter range.

   Rationale: The model otherwise is able to schedule large blocks for regeneration harvest on big game winter range within the first several decades. While acceptable at the minimum viable population level, this would reduce habitat quality to the degree that current huntable populations could not be maintained.

Tradeoff: The decadal allowable sale quantity and fifteen decade present net value are reduced approximately 7.1 million cubic feet and 11.9 million dollars respectively.

3. Constraint: Timber harvest was constrained to achieve 319.2 million cubic feet in the first decade subject to nondeclining flow afterwards.

Purpose: To provide a higher level of wood to local industry.

Rationale: The last increment of present net value gained results in disproportionately high reduction in timber outputs. The maximum timber level would provide a disproportionately large reduction in present net value. Therefore, an intermediate level providing approximately 85 percent of the maximum possible timber output was set as an objective.

Tradeoff: The decadal allowable sale quantity is increased by 59.8 million cubic feet over what is achieved on a max present net value basis without such constraint at a cost of 19.6 million dollars in reduced present net value.

Alternative B-Departure

This alternative was formulated with the primary emphasis on goals for timber, forage, and the local economy. Timber outputs are provided at the level prescribed in the Oregon Department of Forestry program for Oregon (FPFO). This program calls for high levels of timber outputs for five decades. In order to achieve the FPFO timber output levels, it is necessary to depart from nondeclining evenflow (i.e., harvest timber at a high level for the first five decades, and substantially lower harvest in subsequent decades). It is also necessary to harvest many timber stands significantly earlier than culmination of mean annual increment (CMAI). Since the National Forest Management Act requires that CMAI be generally reached before harvest occurs, this alternative cannot be implemented without a change in law. This alternative's allocation is otherwise similar to Alternative B and it shares the same FORPLAN formulation except:

1. Constraint: Nondeclining evenflow and culmination of mean annual increment constraints are released in this alternative.

Purpose: To meet Oregon FPFO objectives within the allocation of Alternative B.

Rationale: It is not feasible to achieve Oregon FPFO levels without releasing both culmination of mean annual increment and nondeclining evenflow constraints.

Tradeoff: First decade allowable sale quantity is increased 101.1 million cubic feet, but very large reductions in timber output occur in the sixth decade with timber falling from 410 million cubic feet of green saw timber to 275 million cubic feet of green saw timber. Present net value of timber is reduced 164.9 million dollars because of the scheduling of timber from lands requiring sophisticated logging systems and the very large investments in planting and precommercial thinning that are required.

Alternative C

This alternative was formulated to deal with goals for timber and range by maintaining moderately high outputs of timber and forage for livestock, but with greater emphasis on deer and elk habitat than Alternatives B or B-Departure. Emphasis is also placed on transportation management and recreation diversity issue goals. It provides near-optimum hiding cover, thermal cover, and forage conditions on big game winter ranges and on selected summer ranges. Nonwilderness portions of the North Fork John Day watershed are managed emphasizing anadromous fish habitat protection. Alpine and subalpine areas in the Elkhorn Mountains around the perimeter of the Wallowa Mountains remain in the wilderness condition to provide additional semiprimitive recreation opportunities. Old-growth objectives exceed MMR levels in order to provide better distribution and to incorporate some existing goshawk habitat.

1. Constraint: The North Fork John Day drainage on the Wallowa-Whitman National Forest, selected portions of summer ranges, and all big-game winter ranges outside Hells Canyon National Recreation Area or wilderness are represented by a maximum area 12.7 percent in age class 0.

   Purpose: To allow for maintenance of near-optimum cover conditions on big-game winter range and selected summer ranges. To preserve stream flow characteristics of North Fork John Day River, an important anadromous fishery.

Rationale: Without such harvest dispersion constraints, the FORPLAN model would otherwise schedule large blocks to be harvested within three decades rendering the areas severely deficient in thermal cover and substantially altering the snow accumulation and snow melt regimes within those blocks of land.

Tradeoffs: The 15-decade present net value and first decade timber outputs are reduced by 26.5 million dollars and 23.2 million cubic feet respectively.

2. Constraint: Selection harvest only is applied to 57,000 acres of sensitive visual foreground areas.

Purpose: To maintain the inventoried visual quality objective for these areas.

Rationale: Provides for maintenance of high visual quality in an area that would otherwise be converted to a tree farm appearance.

Tradeoffs: This level of visual management in foreground areas reduces present net value by approximately 12.2 million dollars and first decade timber outputs by 10.3 million cubic feet.

3. Constraint: 108,780 acres are constrained to minimum level management.

Purpose: To maintain primitive and semiprimitive recreation opportunities associated with alpine areas in the Wallowa and Elkhorn Mountains.

Rationale: Scheduled timber harvest would substantially change the character of this area from primitive to one of roaded natural or roaded natural modified.

Tradeoff: First-decade timber outputs and present net value are reduced approximately 22.3 million cubic feet and 35.6 million dollars respectively. Approximately 109,000 acres are allocated in this alternative. However, 60,750 acres are not available for timber management because they are not forest or are technically unsuitable forest.

4. Constraint: 38,196 acres are constrained to minimum level under old-growth management emphasis.

Purpose: To achieve a better distribution of old-growth, promoting diversity and enhancing the viability of many wildlife populations.

Rationale: The option for managing many of these areas for old-growth would be lost in the first decade as a result of harvest scheduling in FORPLAN if not for this constraint.

Tradeoff: Of the 17,954 acres of old-growth provided beyond MMR requirements, only 10,012 acres were added to the old-growth management strategy. The balance of the acres (including some needed to meet MMR's) were provided by MS-6. First-decade timber harvest is reduced 3.7 million cubic feet and 15-decade PNV is reduced 5.9 million dollars from the Benchmark 7 (max PNV) level.

5. Constraint: The timber harvest was constrained to provide 283.0 million cubic feet in the first decade subject to nondeclining evenflow in subsequent decades.

Purpose: Provide some increase in timber output beyond that achievable without this objective.

Rationale: This level of timber harvest is a compromise between what might be a pure maximize PNW objective and that level of timber output which might be derived from a maximize timber objective.

Tradeoff: Providing an additional 61.8 million cubic feet of timber in this alternative reduces present net value 26.8 million dollars from what could otherwise be achieved by seeking the most cost-efficient management of timber in this alternative.

Alternative C-departure

This alternative was formulated similar to Alternative C, but with additional emphasis on attempting to maintain approximately the current levels of timber offerings among species other than lodgepole pine. This addresses an industry concern over species mix which is one of the major facets of the timber production issue. All constraints are similar to Alternative C with the exception of the timber output objective:

1. Constraint: Non-declining evenflow is released between the first and second decade in this alternative and a timber output level of 365 MMCF is established for the first decade, allowing a drop in the second decade to 266.5 MMCF with nondeclining flow maintained thereafter.

Purpose: To provide near-current levels of timber sale offerings in species other than lodgepole pine.

Rationale: It is necessary to provide specific constraint on both total output and species mix in order to maintain near current levels of offerings in species other than lodgepole pine. Simple substitution of species would fail to capture lodgepole pine stands which are highly susceptible to insect or disease-caused mortality.

Tradeoff: The first-decade allowable sale quantity is increased by 82 MMCF over what would otherwise be provided in Alternative C. This is achieved at a cost of 14.3 million dollars in reduced present net value. An additional cost is born in the reduction of timber harvest levels in subsequent decades from the 283 MMCF per decade of Alternative C to the 266.5 MMCF level in Alternative C-departure.

Alternative D

Alternative D attempts to meet and address the goals of timber and forage production, but is somewhat less commodity-oriented than Alternative B. Big-game winter ranges are managed under Strategy 3, while summer ranges are managed under Strategy 1. Primitive and semi-primitive recreation opportunities are provided in the high elevation areas in the Wallowa and Elkhorn Mountains similar to that in Alternative C. Visual quality objectives will be implemented in accordance with the visual resource management inventory. The old-growth is provided at the MMR level with additional areas added to improve old-growth distribution and incorporate currently occupied goshawk habitat.

1. **Constraint:** Strategy 3 on big-game winter range is represented by a maximum area in age class 0 of 12.7 percent per decade applied through all decades.

   Purpose: To provide for near-optimum conditions on important big-game winter ranges.

   Rationale: Maintenance of high quality hunting and wildlife viewing opportunities is dependent on maintenance of high quality elk habitat, particularly on limiting big-game winter range.

   Tradeoff: The first decade outputs and present net value are reduced approximately 12.8 million cubic feet and 14.7 million dollars respectively.

2.	Constraint:	The maintenance of visual quality at inventoried levels requires modeling of approximately 57,000 acres of visual foreground under a selection harvest-only constraint.
	Purpose:	To maintain current high quality recreation experience along visual foreground areas on the Wallowa-Whitman National Forest.
	Rationale:	FORPLAN would otherwise convert large acreages of these visual foreground areas to a tree farm appearance.
	Tradeoff:	First decade outputs and present net value have been reduced approximately 10.3 million cubic feet and 12.2 million dollars, respectively.
3.	Constraint:	38,196 acres of old-growth are constrained to minimum level outside of Hells Canyon National Recreation Area and Wilderness area in this alternative.
	Purpose:	To improve the old-growth distribution for a variety of wildlife species above and beyond that necessary to maintain minimum viable populations.
	Rationale:	The option for managing many of these areas for old-growth would be lost in the first decade as a result of harvest scheduling in FORPLAN if not for this constraint.
	Tradeoff:	First decade outputs are reduced approximately 3.7 million cubic feet and the present net value is reduced approximately 5.9 million dollars.
4.	Constraint:	The timber harvest was constrained to provide 302.2 million cubic feet in the first decade subject to nondeclining evenflow in subsequent decades.
	Purpose:	Provide some increase in timber output beyond that achievable without this objective.
	Rationale:	This level of timber harvest is a compromise between what might be a pure maximize PNW objective and that level of timber output which might be provided under a maximize timber objective function.

Tradeoff: Providing an additional 68.6 million cubic feet in decadal allowable sale quantity in this alternative reduces present net value 32.3 million dollars from what could otherwise be achieved by seeking the most cost-efficient management of timber in this alternative.

Alternative E

Alternative E attempts to address the issue of maintaining semi-primitive or primitive recreation experience in roadless areas at a minimum cost in terms of commodity production. The Wallowa-Whitman National Forest has been criticized in the past for not fully considering the possibility of maintaining the maximum amount of roadless area in a roadless condition while attempting to maintain timber production at high output levels through intensive management on lands already available for timber harvest. This alternative is developed specifically to address that criticism. Its land allocation resource objectives and FORPLAN model formulation are similar in all respects to Alternative B except for the acreage maintained in a roadless condition.

1. Constraint: 225,690 acres are constrained to a minimum level management intensity within the back-country management emphasis in the FORPLAN model.

   Purpose: To represent maintenance of all areas that will be roadless when this plan is implemented in a roadless condition.

   Rationale: To display the tradeoffs associated with managing for increased acreage in a roadless condition without the increased constraint for other resources also limiting production.

   Tradeoff: First decade timber harvest and present net value for 15 decades was reduced approximately 30.5 million cubic feet and 49.0 million dollars, respectively.

2. Constraint: The timber harvest was constrained to provide 291.1 million cubic feet in the first decade subject to nondeclining evenflow in subsequent decades.

   Purpose: Provide some increase in timber output beyond that achievable without this objective.

   Rationale: This level of timber harvest is a compromise between what might be a pure maximize PNW objective and that level of timber output which might be provided under a maximize timber objective function.

Tradeoff: Providing an additional 62.4 million cubic feet in decadal allowable sale quantity in this alternative reduces present net value 28.8 million dollars from what could otherwise be achieved by seeking the most cost efficient management of timber in this alternative.

Alternative F

This alternative emphasized old-growth, big-game habitat, habitat for snag-dependant species, and roadless recreation, though at a somewhat lesser level than Alternative E. Big-game winter range and summer range are managed under Strategy 3 which is big-game habitat emphasis. A 40 percent snag habitat objective level is also specified for these acres in this alternative. Approximately 75 percent of the existing roadless areas are retained in a roadless condition. This alternative represents a maximum big-game alternative as well.

1. Constraint: All big-game habitat outside of wilderness, Hells Canyon National Recreation Area, or Starkey Experimental Forest is managed to emphasize the maintenance of near-optimum habitat conditions for elk. This is represented in FORPLAN by a constraint of 12.7 percent per decade applied to age class 0, across all decades.

   Purpose: To enhance wildlife habitat on the Wallowa-Whitman National Forest across all acres available and thereby enhance recreational opportunities for viewing and/or hunting elk.

   Rationale: FORPLAN without this constraint would otherwise schedule large blocks of land for regeneration harvest within three decades leaving many areas severely deficient in terms of thermal cover and somewhat deficient in the total cover available.

   Tradeoff: This constraint reduces first decade output of timber approximately 54.6 million cubic feet and present net value over 15 decades by approximately 62.5 million dollars.

2. Constraint: Old-growth is maintained as near current levels as possible considering those acres that are currently under contract or anticipated to be under contract prior to the implementation of this plan. 40,312 acres outside of the Hells Canyon NRA, Wilderness, backcountry, and Starkey Experimental Forest are allocated to be managed for old-growth.

Purpose: Maximize community type/successional stage diversity and associated wildlife populations.

Rationale: Options for managing many of these areas for old-growth will be lost within the first decade without application of this constraint.

Tradeoff: First decade outputs are reduced approximately 4.5 million cubic feet and present net value over 15 decades by approximately 6.3 million dollars from the Max Present Net Value Benchmark (Run No. 7).

3. Constraint: 148,000 acres are constrained to minimum level management intensity under a backcountry emphasis in this alternative.

Purpose: This maintains approximately 75 percent of the currently unroaded areas in an undeveloped state.

Rationale: The option for maintaining these areas in a roadless condition would be lost within the first one to two decades without this constraint. This intermediate range of roadless area allocation provides for a full consideration of the range of recreation opportunities.

Tradeoff: First decade timber output is reduced approximately 21.5 million cubic feet and present net value over 15 periods is reduced by approximately 34.4 million dollars.

4. Constraint: The timber harvest was constrained to provide 214.8 million cubic feet in the first decade subject to nondeclining evenflow in subsequent decades.

Purpose: Provide some increase in timber output beyond that achievable without this objective.

Rationale: This level of timber harvest is a compromise between what might be a pure maximize PNW objective and that level of timber output which might be produced given a maximize timber objective function.

Tradeoff: Providing an additional 28.7 million cubic feet in decadal allowable sale quantity in this alternative reduces present net value 21.2 million dollars from what could otherwise be achieved by seeking the most cost efficient management of timber in this alternative.

Alternative G

Alternative G is similar to Alternative B, except that timber harvest is limited to those lands and those prescriptions that produce a positive rate of return. This alternative, when compared to Alternative B, displays the tradeoffs associated with maintaining high levels of timber production on the Wallowa-Whitman National Forest. Constraints applied are similar in all respects to those that were applied in Alternative B. The apparent tradeoffs of these constraints in timber outputs is somewhat less than experienced within Alternative B, because many available timber lands are not managed. First decade allowable harvest is reduced approximately 63.8 million cubic feet, but present net value over 15 decades is increased 15.8 million dollars compared to Alternative B, because Alternative G was given no timber harvest floor.

1. Constraint: 23,000 acres of highly sensitive visual foregrounds are constrained to selection harvest only.

   Purpose: Provide for maintenance of high scenic quality along highly sensitive travel routes.

   Rationale: The maintenance of visual quality requires distribution of age classes which would be approximated by a rate of regeneration of harvest constraint not to exceed 4 percent per decade. The incorporation of selection harvest yield tables approximates a similar management on a group selection basis.

   Tradeoff: The decadal allowable sale quantity and fifteen decade present net value are reduced approximately 4.2 million cubic feet and 4.9 million dollars respectively.

2. Constraint: Management Strategy 2 was applied across all big game winter ranges outside of Hells Canyon National Recreation Area and Wilderness.

   Purpose: To maintain more effective deer and elk cover on big game winter range.

   Rationale: The model otherwise is able to schedule large blocks for regeneration harvest on big game winter range within the first several decades. While acceptable at the minimum viable population level, this would reduce habitat quality to the degree that current huntable populations could not be maintained.

   Tradeoff: The decadal allowable sale quantity and fifteen decade present net value are reduced approximately 7.1 million cubic feet and 11.9 million dollars respectively.

3. Constraint: Timber harvest was restricted to those land/prescription groupings producing a positive rate of return.

Purpose: Provide an estimate of the timber production level consistent with project level efficiency.

Rationale: Without this constraint, FORPLAN would blend in inefficient land/prescription groupings which would, due to harvest scheduling constraints, increase the alternative's overall present net value.

Tradeoff: Present net value is reduced 5 million dollars from what could otherwise have been achieved by seeking the most cost-efficient management of timber for the entire alternative rather than for its components.

Alternative H

Alternative H is identical to Alternative C in its FORPLAN resource management objectives except that timber is provided at approximately 80 percent of the maximum potential within those resource objectives. This allows for a more cost-efficient management of timber within the other resource management objectives.

Constraints applied within this FORPLAN run were identical to those found in Alternative C.

1. Constraint: The timber harvest was constrained to provide 251.6 million cubic feet in the first decade subject to nondeclining evenflow in subsequent decades.

Purpose: Provide some increase in timber output beyond that achievable without this objective.

Rationale: This level of timber harvest is a compromise between what might be a pure maximum PNW objective and that level of timber output found in Alternative C.

Tradeoff: Providing an additional 30.4 million cubic feet in decadal allowable sale quantity in this alternative reduces present net value 6.1 million dollars from what could otherwise be achieved by seeking the most cost efficient management of timber in this alternative.

In summary, Alternative A represents continuation of current management direction of approved land use plans. This is the no action alternative required by NEPA. Alternatives B, E, and G emphasize timber production on lands available for timber harvest. Alternative B would consider all lands outside of wilderness, Hells Canyon NRA, and Starkey Experimental Forest available for timber harvest. Alternative E would exclude from that consideration those lands and areas that are currently unroaded, and Alternative G would exclude from available lands prescriptions that are not economically efficient. Alternatives D, C, H, and F place increasing emphasis on satisfying amenity values. These are addressed in various combinations with Alternative H representing a more cost efficient way of producing timber on lands that have similar management objectives to Alternative C. B-Departure and C-departure attempt to meet local timber needs with B-departure emphasizing FPFO objectives and C-departure emphasizing maintenance of green sawtimber volumes other than lodgepole pine.

VIII. ESTIMATING EFFECTS OF BENCHMARKS, DISCRETIONARY CONSTRAINTS AND ALTERNATIVES

A. Introduction

Many FORPLAN runs were made for the purpose of identifying, estimating, and displaying the effects of each benchmark, discretionary constraint, and alternative. The purpose of this is to provide the decisionmaker with more specific information as to the particular tradeoffs between resource objectives of a given alternative. It provides the technical reviewer specific estimates of opportunity costs associated with various resource constraints so that the reasonableness of the constraint as a representation of a given resource objective and whether that resource objective is being met in the most cost efficient manner might be better assessed.

B. Testing of Constraints

Many of the benchmarks and numerous alternatives were run with one or more constraints deleted from the "package" that represented that alternative. Several alternatives were incremental variations of other alternatives. For example, Alternative E added a substantial increment of roadless area to the allocation in Alternative B without other significant changes in the model. This allowed isolation of the cost of allocating areas to roadless management.

The isolation of such constraints between FORPLAN runs allows the calculation of per acre coefficients of opportunity costs for present net value and cubic foot output of timber. These are then used to make estimates of the cost of that constraint within the context of other alternatives. Nearly all alternatives were run with five different objective levels of timber, as well as the variations in constraints which moved one alternative to the next.

It is not practicable at $200 to $300 per FORPLAN run to incrementally add or remove individual constraints in the context of each alternative. As one moves from one alternative to the next, increasing or decreasing the allocations to other potentially overlapping resource objectives may result in that particular constraint having either higher or lower per acre opportunity cost coefficients. Generally, the overlap is partial and it is expected that these coefficients represent reasonable approximations of the distribution among individual constraints of the total tradeoff between alternatives. Table B-24 summarizes the constraints, the per acre coefficients for timber and present net value associated with a constraint, and the runs that were compared in isolating each particular constraint. A discussion of the reasons for particular constraint formulations follows.

1. Rationale for Use of Dedicated Old-Growth.

The Wallowa-Whitman elected to provide old-growth habitat by dedicating stands to old-growth in the allocation of lands. Two additional alternatives were considered prior to selection of this dedicated old-growth strategy: 1) managed old-growth with only the immediate replacement stands designated; and 2) managed old-growth which provides for all future replacement stands. Dedication of existing old-growth stands assures that desired structural characteristics will be available for wildlife. It risks the loss of individual stands through catastrophe or decay. However, recent literature on old-growth suggests that such risk is much less than once thought, indeed management removes structural characteristics important to old-growth and may hasten the decline of the residual stand (Franklin 1981). The distribution of old-growth/mature habitats specified in the minimum management requirements for wildlife provides sufficient surplus habitat so that replacement of individual stands can be accomplished as part of the normal 10 to 15 year planning cycle.

Both of the managed old-growth strategies assure that the desired structural characteristics will be available in existing stands, but the existing old-growth stands are scheduled for harvest 50-80 years hence. Any failure of the replacement stands to develop desired structural characteristics on schedule means that old-growth is lost for a period of time or that further delay in harvesting the existing old-growth stands must occur.

Under a dedicated old-growth strategy, each acre of old-growth is withdrawn from timber production for the duration of the harvest schedule (150 years). Under either of the managed old-growth concepts that old-growth acre may be made available for harvest during the conversion period, but a similar mature timbered acre must then be selected for replacement and withdrawn through the end of the harvest schedule (150 years). The Wallowa-Whitman inventory does not

Table B-24
OPPORTUNITY COST COEFFICIENTS FOR BENCHMARK AND ALTERNATIVE CONSTRAINTS 1/

Constraint	Constraint Formulation	CF/AC/Decade	PNV/Acre	Runs Compared
MS-1 (MMR HRVST Dispersion)	MX Area Age 0 @ 33% per Decade per AA	19.5	68.64	Run #7 with MMR'S and Run #7 w/o harv dispersion (#182-183) 326.9-308.1 MMCF 411.2-344.9 MM$ / 965,890 acres
MS-2 (Modified Timber Emph) 2/	MX Area Age 0 @ 16.7% per Decade per AA	40.6	69.27	Run #7 amd Run #7 with MS-2 on big game winter rng(#180-145) 271.4-264.3 MMCF 249.7-237.6 MM$ / 174,690 acres
MS-3 (Big Game Emphasis) 2/	MX area age 0 @ 13.3% per Decade per AA	79.8	91.19	Alt C basis without timber target (#204-205) 245.6-224.6 MMCF 224.5-200.5 MM$ / 263,180 acres
MS-5 (Phillips Lake) 2/	Selection Harvest	181.2	213.82	Same constraint formulation as visual
MS-6 (Undeveloped Disp Rec) 2/	Minimum Level	366.4	253.84	Alt B and Alt E basis without timber target (#170-142) 259.4-228.9 MMCF 231.6-210.4 MM$ / 83,517 acres
MS-7 (Wild and Scenic River)	Not Modeled			
MS-8 (Snake River Corridor)	Minimum Level	0	0	No suitable timber lands
MS-9 (NRA Disp Rec/Natve Veg) /3	Minimum Level	265.1	627.74	Run #7 W/O HCNRA CMP and Run #7 with CMP (#181-180) 295.3-271.4 MMCF 306.3-249.7 MM$ / 90,165 acres
MS-10 (NRA Forage Production) /3	Minimum Level	265.1	627.74	Same constraint formulation as MS-9
MS-11 (NRA Disp Rec/Timber) /2	Selection Harvest or MX Area Age 0 @ 13.3% and Min Area Age 20 @ 10% and Min Area age 12 @ 20%	95.6	288.37	Run #7 W/O HCNRA CMP and Run #7 W/ MMRS all lands (#182-181) 308.1-295.3 MMCF 344.9-306.3 MM$ / 133,854 acres
MS-12 (Indian Cr Research Natural Area) /2	Minimum Level	366.4	253.84	Same constraint formulation as MS-6
MS-14 (Starkey Ex For) /2	Minimum Level	366.4	253.84	Same constraint formulation as MS-6
MS-15 (Old-Growth) /2	Minimum Level	366.4	253.84	Same constraint formulation as MS-6
MS-16 (Adm Sites, Rec Sites) /2	Minimum Level	366.4	253.84	Same constraint formulation as MS-6
MS-18 (Anadromous Fish Habitat) /2	MX Area Age 0 @ 13.3% Per Decade pre AA	79.8	91.19	Same constraint formulation as MS-3
Riparian /2	Selection Harvest	181.2	213.82	Same constraint formulation as visual foreground
Visual Foreground /2	Selection Harvest	181.2	213.82	Run #7 W/ MS-2 on BGWR and Alt B w/o timber target (#145-170) 224.6-221.2+.4 MMCF 237.6-231.6+.7 MM$ / 24,787 acres
Visual Middle Ground /2	Within MS-1 MX Area Constraint Tightened to 30.4% Per Decade; MS-3 TO 12.7% PER DEC	48.0	66.37	Alt C w/o timber target and same w/o VIS MG (#204-181) 224.6-221.2 MMCF 200.5-195.8 MM$ / 70,825 acres

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1/ Economic data from FORPLAN exclusive of nontimber considerations.
2/ Cost in excess of MMR level for harvest dispersion.
3/ Cost in excess of MMR level for Hells Canyon National Recreation Area.

differentiate between mature and old-growth stands in either starting volume or future growth potential. This means that, therefore, for each acre of old-growth in a managed old-growth strategy, one acre of mature timber would be withdrawn from timber production and a second acre of mature timber would be deferred for 50-80 years. Only one acre is withdrawn under the dedicated old-growth strategy actually used.

Alternatively, replacement old-growth could be selected from a younger stand in order to avoid the sacrifice of volume represented by the more mature stand. But then both that younger stand and the existing old-growth stand would have to be held beyond the conversion period for the Forest in order for the younger stand to develop old-growth characteristics. This is the equivalent of withdrawing two acres from timber harvest since neither acre is available to meet nondeclining flow objectives during the conversion period.

2. The Rationale for Harvest Dispersion Constraints

The National Forest Management Act regulations (36 CFR 219.27(b)(1),(3)(6)) require that management prescriptions involving vegetative manipulation of tree cover for any purpose shall:

> "Be best suited to the multiple-use goals established for the area with the potential environmental, biological, cultural resource, aesthetic, engineering, and economic impacts being considered...; not be chosen primarily because they will give the greatest dollar return or the greatest output of timber, though these factors shall be considered...; and provide the desired effects on water quantity and quality, wildlife and fish habitat, regeneration of desired tree species, forage production, recreation uses, aesthetic values, and other resource yields..."

These regulations (36 CFR 219.27(d)(1)) also require that openings created by even-aged management shall be located to achieve the desired combination of multiple-use objectives.

> "The blocks or strips shall be shaped and blended with the natural terrain to the extent practicable to achieve aesthetic, wildlife habitat, or other objectives established in the Forest Plan".

The Regional Guide states that a harvest area is considered a created opening until the new stand of trees is 4½ feet in height. Allowing harvest of the adjacent stand as soon as the newly forested area is 4½ feet tall results in minimal edge contrast between seedlings and bare ground.

The FORPLAN model, driven by a maximize PNW objective function, will consistently select the highest net-valued timber stands (analysis areas) for harvest in the first decade. Within this subset it may further schedule analysis areas in the order in which the algorithm first encounters them. As result, some analysis areas may be scheduled in their entirety within the first decade even though other selections might also satisfy the objective function. Nondeclining evenflow is satisfied as long as other stands are available for harvest in later decades.

These high net-valued analysis areas usually are found in contiguous stands which are substantially larger than the 40-acre maximum regeneration unit size. The scheduling for harvest of such an analysis area in one decade is contrary to the NFMA Regulations. The Regional standard, requiring a new stand to be 4½ feet high before it is no longer considered an opening would allow for a theoretical checkerboard pattern of 40-acre openings interspersed with 4½-foot tall trees. This fails the test of the NFMA Regulations in that it provides no cover within that area for wildlife and no discernible edge contrast for shaping and blending of harvest units to the extent practicable.

Regional direction also precludes cutting more than 1/3 of the perimeter of a natural opening larger than 30 acres. The Wallowa-Whitman has a large number of natural openings interspersed with timber stands in many areas. This fact alone makes a 50 percent constraint virtually impossible; the fact that in most areas harvesting patterns have already been established further compounds the problem. For these reasons the 50 percent per decade constraint which is only theoretically implementable was rejected. Harvest units will be separated by logical logging units and the corners of harvest units will generally not touch. A constraint of 33 percent per decade as the maximum area of regeneration harvest within any analysis area approximates this objective.

A 33 percent decadal constraint on the rate of regeneration harvest allows for minimal development of cover for deer and elk on approximately 30 percent of the area prior to completing the regeneration harvest of an existing stand in the third decade. The first one-third harvested from an existing timber stand will have also grown to sufficient height to provide a definable edge contrast between it and the last one-third harvested. Trees are expected to be approximately 15-20 feet tall on the first third in contrast to bare ground on the last third harvested, and approximately 4½-feet tall trees on the second third. This constraint provides minimal benefits for other resources. It represents the maximum decadal timber harvest allowable, consistent with the regulations.

3. Rationale for Use of a Selection Harvest Only Constraint

A selection-harvest-only constraint was used for modelling timber management within the Dispersed Recreation/Timber Management Strategy of the Hells Canyon National Recreation Area, in riparian zones, and in areas where the visual quality objective was foreground retention or partial retention. This approach was used for two reasons. First, it provided an estimate of the timber harvest reduction (on a per acre basis) likely to result from the harvest adjustments necessary to meet the special management objectives in these areas. Second, it could be accomplished without greatly increasing the size of the FORPLAN model. The alternative of modelling timber harvest in these areas using even-age methods was considered, but would have required nearly 800 more prescriptions in the FORPLAN model.

Although modelled using selection harvest only, it is recognized that other silvicultural tools may actually be used in specific situations. It is not intended that management of these areas will always be limited to selection harvest techniques.

C. Analysis of Tradeoffs Among Alternatives

The response of each alternative to ICO's or groups of ICO's is summarized in Table II-1, Chapter II. Resource output levels are also summarized in Table II-3a, Chapter II of the DEIS. The description of how the alternatives affect individual resources and more detailed discussions of the environmental consequences are found in Chapter IV, of this DEIS. Social and Economic effects are displayed in the tables summarizing the responses to ICO's and are discussed in Chapters II and IV of the DEIS.

As shown in Table B-25, Alternative G generates the highest present net value, the primary decision criterion for economic efficiency. It achieved this standing because it was given the least restrictive (in terms of allowing timber to be harvested) land allocation and FORPLAN was used to approximate maximum economic efficiency. Alone among the alternatives, Alternative G was modeled to preclude the possibility of harvesting any stand types which would not generate a positive present net value if sold alone.

Alternative B gives up $22 million in present net value to Alternative G because it was assigned a very high timber target. Achieving this timber target of 158 MMBF in decade one, an increase of 31 MMBF over Alternative G's economically efficient level of 127 MMBF, cost $22 million. Annualizing that $22 million loss over the 32 MMBF in extra volume per year results in a loss of $30 per MBF. While both G and B share the same FORPLAN data input set, Alternative B harvests the Lake Fork Roadless Area outside the HCNRA in order to meet its assigned timber target. Alternative G with no such timber target leaves the area unharvested.

Table B-25
INCOME TRANSFERS FOR DECADES 1, 2, 5 AND 6
1982 MILLION DOLLARS

Alternative	G	B	H	E	C	D	C-dep	F	A 1/	B-dep 2/
Present Net Value	651	629	620	606	598.2	598.1	586	574	556	468
Decade 1										
Willingness-To-Pay Values for Forest Outputs 3/	36.6	39.4	34.4	37.6	37.1	37.9	40.6	32.1	36.4	35.7
Forest Receipts 4/	15.7	18.4	14.5	16.7	16.0	16.8	18.9	11.1	15.3	15.0
Income Transfers	20.9	21.0	19.9	20.9	21.1	21.1	21.7	21.0	21.1	20.7
Decade 2										
Willingness-To-Pay Values for Forest Outputs 3/	40.9	42.8	39.1	41.3	39.9	40.9	38.0	36.7	39.4	45.7
Forest Receipts 4/	17.5	19.1	15.4	17.7	16.0	17.1	14.0	12.5	15.5	22.0
Income Transfers	23.4	23.7	23.7	23.6	23.9	23.8	24.0	24.2	23.9	23.7
Decade 5										
Willingness-To-Pay Values for Forest Outputs 3/	51.9	53.5	50.9	47.7	48.1	48.1	47.6	50.1	42.1	39.5
Forest Receipts 4/	20.5	21.5	18.9	16.2	15.9	16.1	15.5	17.7	10.3	7.9
Income Transfers	31.4	32.0	32.0	31.5	32.2	32.0	32.1	32.4	31.8	31.6
Decade 6										
Willingness-To-Pay Values for Forest Outputs 3/	50.5	51.2	49.4	48.5	49.6	48.6	48.0	51.4	47.7	44.8
Forest Receipts 4/	19.1	19.1	17.3	16.8	17.3	16.6	15.7	19.0	15.9	13.0
Income Transfers	31.4	32.1	32.1	31.7	32.3	32.0	32.3	32.4	31.8	31.8

1/ Alternative A cannot be implemented without change to existing Federal legislation. It does not meet minimum management requirements for wildlife.

2/ Alternative B-dep cannot be implemented without change to Federal legislation. It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting.

3/ Undiscounted benefits from all Forest outputs quantified including those in 4/ below as well as benefits accruing from recreation, water, and anadromous fish.

4/ High bid stumpage values, grazing receipts, and miscellaneous receipts.

(Throughout this document reference will be made to timber offerings in board foot measure. FORPLAN, however, uses cubic foot measure alone. Therefore, all board foot timber targets have to be converted to cubic foot measure for input to FORPLAN. Because the Forest has a wide range of conversion ratios in different timber stands, depending on such considerations as species, age, and condition, these efforts are necessarily approximate.)

The effects of extremely high timber targets on economic efficiency are shown in Alternative B-departure which sacrifices $185 million in present net value to generate average annual timber offerings 59 MMBF higher than the five-decade average Alternative G level. Part of that $183 million cost occurs in the sixth and subsequent decades when Alternative B-departure's timber production falls. It is important to note that the true cost of implementing Alternative B-departure would be even higher than the $183 million shown. This is due to the fact that Alternative B-departure was allowed to violate NFMA provisions which require that regeneration harvests shall not occur unless stands shall generally have achieved culmination of mean annual increment. In B-departure, stands are generally harvested prior to culmination of mean annual increment. If Alternative G were run free of that requirement, as was Alternative B-departure, its present net value would have been even higher. The $183 million is, therefore, an underestimation of the loss in present net value.

Alternatives H, C, and C-departure share the same FORPLAN input land allocation and vary only with respect to meeting timber targets (the same is true for Alternatives G, B, and B-departure). The primary reason this land allocation generates lower present net value figures is that this land allocation imposes more restrictions on timber harvest. These restrictions include fewer acres available due to increased emphasis on roadless recreation and old-growth timber; additional constraints added to the rate of timber harvest on big-game winter ranges, some big-game summer ranges and anadromous fisheries emphasis areas; and more acres allocated to visual retention and partial retention.

Moving from Alternative H's five-decade average annual sawtimber harvest level of 131 MMBF to Alternative C's 143 costs about $25 million in present net value. Annualizing this cost shows that choosing Alternative C rather than Alternative H would be done at a cost of about $1 million annually or about $84 per MBF. Alternative C-departure, with its even higher first-decade harvest levels, 177 MMBF, is itself $12 million lower in present net value than Alternative C.

Alternative E was formulated in response to the wishes of those citizens who felt the Forest should manage its roaded areas intensively for timber and stay out of the remaining roadless areas. It manages to do this and to still generate a present net value some 93 percent of the maximum present net value alternative. Its land allocation is more restrictive than is that used for G, B, or B-departure. Compared to the land allocation in H, C, and C-departure, that used in Alternative E is more restrictive in some respects, less restrictive in others. Alternative E effectively establishes the roaded sections of the Forest for intensive timber management while the land allocation in Alternatives H, C, and C-departure reserves much of this land for less intensive timber management to meet other multiple use objectives.

Table B-26 breaks out costs between those which are designed to generate benefits over a long period of time (capital investments) and those which are meant to meet short-term objectives (operational and maintenance). Investments "pay off" over a period of years and thus are more properly viewed against a backdrop which includes future benefits as well.

As shown in Table B-27, Alternatives E, C, D, and F all share a common timber target when expressed as a percentage of the maximum possible nondeclining flow first-decade timber harvest on their respective land allocations. The reader should keep in mind that the 90 percent target is respective to the individually determined land allocations. The 90 percent target is necessarily lower for Alternative F because the lands have been allocated to an amenity emphasis. Alternatives E, C, and D with their similar first decade offerings of 145, 143, and 149 MMBF indicate comparable maximum timber harvest capabilities. The ranking, in terms of Present Net Value, would tend to indicate that achievement of the 90 percent goal was most difficult for Alternative D (due to its need to harvest a greater percentage of uneconomic stands) and less difficult for Alternative E which managed to outstrip Alternative C's production level and still maintain its priority in the efficiency criterion--present net value.

In the balance then, Alternative E's land allocation would be viewed as being less restrictive to timber harvesting than is Alternative C's.

Alternative F is the alternative which most emphasizes amenities. As such, it dedicates extensive areas of the Forest to nonharvest prescriptions with a resulting decrease in timber outputs as well as present net value. Assignment of a timber target to an amenity emphasis alternative may seem incongruous to many. The purpose of assigning the timber target was to make the alternative more politically viable given the dependence of the local economy on timber industry. Without this target, FORPLAN would also forego opportunities to enhance wildlife habitat through timber harvest. Without the timber target, first-decade output levels would be around 66 MMBF rather than the 100 MMBF finally identified for the alternative.

The Forest's current management direction is best summarized by Alternative A. It reflects the direction contained in the Forest's various unit plans which were designed to manage different sections of the Forest. As such, it is a combination of direction. With regard to old-growth, it violates environmental requirements which rise from NFMA. Existing harvest levels

Table B-26
UNDISCOUNTED AVERAGE ANNUAL FIRST DECADE COSTS BY ALTERNATIVE
OPERATIONAL AND MAINTENANCE COSTS (O & M)
CAPITAL INVESTMENT COSTS (CI)
1982 MILLION DOLLARS
(MAY NOT SUM DUE TO ROUNDING)

Alternatives	G	B	H	E	C	D	C-dep	F	A 1/	B-dep 2/
Present Net Value	651	629	620	606	598.2	598.1	586	574	556	468
Operational and Maintenance Costs	9.9	11.2	9.9	10.7	10.5	10.9	12.1	9.2	10.5	12.1
Capital Investment Costs	8.5	11.1	9.0	10.8	11.1	11.1	13.7	8.8	10.3	15.9
Total Budget Costs Historical Budget Level FY 1980-1983 Averaged $23.1 Million	18.4	22.3	18.9	21.4	21.7	22.0	25.8	18.0	20.7	27.9

1/ Alternative A cannot be implemented without change to existing Federal legislation. It does not meet Minimum Management Requirements for wildlife.

2/ Alternative B-dep cannot be implemented without change to Federal legislation. It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting.

Table B-27
TIMBER TARGETS ESTABLISHED BY ALTERNATIVE

	ALTERNATIVE									
	G	B	H	E	C	D	C-dep	F	A 1/	B-dep 2/
FORPLAN Run Identification	616175	616167	616188	616150	616190	616154	616193	616151	616200	616195
Percentage of Maximum Timber Production Possible in Decade 1 (Used as a Timber Target)	No Target--Maximized Efficiency	85	80	90	90	90	116 Departure	90	99 With Budget Constraint	96 Departure
Actual Timber Target Assigned (MMCF/Year in Decade 1)	No Target--Maximum Efficiency Resulted in Output Level of 25.5	31.9	25.2	29.1	28.3	30.2	36.5	21.5	28.2	36.0

1/ Alternative A cannot be implemented without change to existing Federal legislation. It does not meet Minimum Management Requirements for wildlife.

2/ Alternative B-dep cannot be implemented without change to Federal legislation. It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting.

(159 MMBF) cannot be maintained under this alternative's land allocation. Timber output levels of 139 MMBF are the highest levels consistent with the alternative's budget constraint which is itself based on a multiyear record of experienced costs. This is the only alternative run with a budget constraint and the only alternative run with a virtual (99 percent) maximize timber objective function. These differences, combined with the unique land allocation based on existing unit plans, make comparison with other alternatives extremely difficult. Perhaps most noticeable is the fact that in terms of timber extraction, Alternative A has--except for Alternative F--the most restrictive land allocation. Another observation is that the Forest's historical budget levels have not impeded its economic performance. The Forest has in fact been offering timber sales at a level far in excess of what could be justified from the viewpoint of economic efficiency.

D. Specific Points of Comparison

1. Net Cash Flow

Table B-28 displays the Forest's net cash flow over time by alternative. This information is presented to answer the recurring question of how the Forest's cash receipts compare with its cash expenditures. Because the timber program accounts for close to 99 percent of all Forest receipts, the discussion here will focus on their variation over time by alternative.

Variations were made in Forest outputs for range levels and attendant grazing receipts. No changes are projected between alternatives for miscellaneous receipts.

2. Receipts

Timber receipts are affected by the amount of timber sold, the species, its quality, its accessibility, and market condition. Basically, as long as harvest volumes are not excessive to the economic capabilities of the stands, increased harvest volumes mean increased timber receipts. Part of this increase is due to the fact that timber sales may blend in a certain portion of noneconomic stands with economic stands and still provide attractive sale packages. All Forest alternatives except G (which allows harvest only on those stands which can generate positive Present Net Values independently) adopt this practice. Another feature to be considered is the role played by timber targets which were assigned every alternative but G. These targets were assigned the alternatives in response to the alternative's respective responses to issues, concerns, and opportunities. Achievement of timber targets in alternatives with highly restrictive land allocations (in terms of timber extraction) is generally more difficult and thus more costly in terms of

Table B-28

AVERAGE ANNUAL NET CASH FLOWS, RECEIPTS, AND COSTS BY ALTERNATIVE FOR THE FIRST, SECOND, FIFTH AND SIXTH DECADES, UNDISCOUNTED 1/
1982 MILLION $

Alternative	G	B	H	E	C	D	C-dep	F	A 2/	B-dep 3/
Present Net Value	651	629	620	606	598.2	598.1	586	574	556	468
Decade 1										
Noncash Benefits 4/	23.006	23.929	23.282	23.656	24.305	24.127	26.407	23.300	24.307	25.436
Cash Receipts 5/	13.582	15.452	12.138	13.966	12.778	13.742	14.243	8.795	12.066	10.302
Costs 6/	15.694	18.677	15.994	17.983	17.818	18.274	20.261	15.215	17.069	22.421
Net Cash Flow 7/	-2.112	-3.225	-3.856	-4.017	-5.040	-4.532	-6.018	-6.420	-5.003	-12.119
Decade 2										
Noncash Benefits 4/	26.261	26.470	26.536	26.418	26.515	26.892	26.076	27.035	26.979	27.660
Cash Receipts 5/	14.659	16.286	12.567	14.875	13.432	14.080	11.875	9.631	12.380	18.076
Costs 6/	14.653	17.271	14.879	16.434	16.052	16.838	15.967	13.557	16.591	20.144
Net Cash Flow 7/	+0.006	-0.985	-2.312	-1.559	-2.620	-2.758	-4.092	-3.926	-4.211	-2.068
Decade 5										
Noncash Benefits 4/	32.961	34.190	33.954	33.775	34.295	34.203	34.182	34.031	34.153	38.704
Cash Receipts 5/	18.908	19.319	16.903	13.945	13.762	13.851	13.460	16.033	7.899	0.837
Costs 6/	14.141	16.539	14.257	15.400	15.105	15.488	14.613	13.857	15.004	19.122
Net Cash Flow 7/	+4.767	+2.780	+2.646	-1.455	-1.343	-1.637	-1.153	+2.176	-7.105	-18.285
Decade 6										
Noncash Benefits 4/	33.532	33.543	33.613	32.989	33.663	33.316	33.718	33.844	33.156	33.271
Cash Receipts 5/	16.951	17.670	15.757	15.473	15.962	15.314	14.250	17.577	14.511	11.514
Costs 6/	13.857	15.809	13.935	15.726	14.809	15.790	14.504	13.553	15.055	15.814
Net Cash Flow 7/	+3.094	+1.861	+1.822	-0.253	+1.153	-0.476	-0.254	+4.024	-0.494	-4.300

1/ Costs are limited to agency expenditures and the expenditures of livestock permittees to improve grazing allotments. Other permittee expenditures are not included, nor are payments to local governments.

2/ Alternative A cannot be implemented without change to existing Federal legislation. It does not meet Minimum Management Requirements for old-growth.

3/ Alternative B-dep cannot be implemented without change to Federal legislation. It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting by allowing widespread harvesting of stands two or more decades prior to achievement of CMAI.

4/ Noncash benefits are those not collected as cash receipts.

5/ Comprises timber stumpage receipts (statistical high bid), grazing fee receipts, and miscellaneous receipts.

6/ All Forest costs except those for Purchaser Credit Roads, Co-op Road Maintenance, and Treatment of Activity Fuels which costs are already reflected in lower statistical high bid values.

7/ The difference between the receipts and the costs shown.

Present Net Value. As mentioned before, increasing average annual sawtimber offerings 31 MMBF cost about $30 per MBF in shifting from Alternative G to Alternative B (a timber harvest emphasis land allocation) whereas only 12 MMBF would be gained at a cost of $84 per MBF in the more restrictive land allocations shared by Alternatives C and H.

The effect of timber floors on Present Net Value in any given land allocation is reflected in Table B-29 which shows Present Net Value change resulting from application of minimum timber harvest levels.

These reductions in present net value arise because they force the model to schedule timber which is economically less desirable due to its species mix, quality, or accessibility.

Species mix affects timber receipts in more ways than one. The obvious implication from a shift in species harvested is that more valuable species, such as ponderosa pine, bring a greater return than do the lesser valued species such as lodgepole pine. More subtle effects arise due to differences in timber yield tables, silvicultural practices, and alternative-respective responses to issues, concerns, and opportunities. Timber quality relates to such dimensions as timber size, clarity, freedom from defect, and the like. Accessibility accounts for differences in the costs of extracting timber due to such site-respective considerations as the logging system required (tractor, short-span or long-span cable, helicopter); harvest method (commercial thin, regeneration harvest, overwood removal); and degree of roading required.

Consider the cases shown in the preceding tables. Referring to the timber-emphasis land allocation, we see that as progressively more timber is harvested from a particular land allocation that more acres of timber land are brought into timber production and the present net value declines. This is because Alternative G, free from any timber harvest floor, elects to harvest virtually no long-span or helicopter ground and about 11 percent less lodgepole pine sawtimber. By the second decade, Alternative G is only taking about 1 percent of its sawtimber from lodgepole pine while Alternative D is at 18 percent (Table B-30 and Table B-31 of this document). Alternative B, with a first-decade timber harvest 25 percent higher than that economically indicated, still manages on the whole to bypass the difficult and costly-to-log helicopter and long-span lands. However, it must increase its incidence of short-span cable logging by about 50 percent (in the first decade) over that specified in Alternative G and it must absorb the costs of accessing the Lake Fork Roadless Area outside the HCNRA which Alternative G elected to avoid for economic reasons. The figures in Table B-30 also reveal that the volume came off land less heavily wooded on the average than in the case of Alternative G.

Table B-29
EXAMPLES OF PRESENT NET VALUE RESPONSE TO TIMBER HARVEST MINIMUM LEVELS (FLOORS) 1/

Timber Emphasis Land Allocation Input to FORPLAN

Alternative	G	B 2/	B-dep
Present Net Value (1982 Million $)	651	629	468
Timber Harvest Floor in Decade 1 (MMCF/Year)	3/	31.9	36.0
Land in Timber Management (Thousands of Acres)	801	875	937

Timber-Amenity Blend Land Allocation Input to FORPLAN

Alternative	H	C	C-dep
Present Net Value (1982 Million $)	620	598.2	586
Timber Harvest Floor in Decade 1 (MMCF/Year)	25.2	28.3	36.5
Land in Timber Management (Thousands of Acres)	784	832	843

1/ Other factors change the present net value, but only to a small extent. They do not mask the effects explained in the narrative.
2/ Alternative B-departure cannot be implemented without change to Federal legislation. It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting.
3/ Yielded 25.5 MMCF/year in decade 1 without a timber harvest floor.

With the imposition of the even higher timber targets contained in B-departure, the model is forced to harvest long-span and helicopter ground even in the first decade (Table B-30) to the extent that those expensive logging systems are used on about 10 percent of the acres harvested.

Similar patterns are evident in the timber/amenity blend land allocation used for Alternatives H, C, and C-departure. Alternative H harvests no long-span or helicopter ground in the first decade while Alternative C harvests that land type to the extent that it makes up about 5 percent of its total acres harvested (Table B-30). Likewise, while Alternative H harvests short-span ground in the first decade on some 18 percent of its total area harvested, Alternative C harvests 23 percent. Whereas Alternative H harvests only some 11 percent of its sawtimber in the first five decades from lodgepole, Alternative C uses lodgepole to make up over 17 percent of its volume (Table B-31). Alternative C-departure follows this same trend, moving more heavily into both short-span cable ground (25 percent) and long-span-helicopter ground (6 percent) in the first decade.

Timber quality includes consideration of whether the material is suitable for sawing (sawtimber); pulping or chipping (roundwood); or personal use fuelwood. Sawtimber is the only material tracked in FORPLAN. Another dimension of quality relates to the conversion ratio or the amount of board feet which can be produced by a single cubic foot of sawtimber. This is primarily a concern in the regenerated stands which are still growing rapidly and which, therefore, are still experiencing significant changes in conversion ratios over time. The earlier the regenerated stand is harvested, the less its value per cubic foot. The smaller the diameter of the tree, the less its conversion ratio. These characteristics are included in FORPLAN dollar valuations so the model can consider these changes in value over time along with other differences in making its harvest decisions. Put basically, the higher the timber target, the more likely the model is to call stands to harvest early in their regeneration cycles. This is illustrated in Table B-28 which shows, among other things, Forest receipts over time. Compare the receipt figures for Alternatives B and B-departure. Remember that B-departure was run with its achievement of CMAI constraint relaxed. This helps show, in an exaggerated way, the effects of harvesting early in the rotation cycle. Notice that Forest receipts are higher in Alternative B than in Alternative B-departure by the fifth and the sixth decades. A great deal of this effect is caused by Alternative B-departure's premature entry into regenerated stands which have not achieved culmination of their economic efficiency.

Table B-30
TIMBER OUTPUTS AND ACTIVITIES BY ALTERNATIVE

All figures represent average annual conditions in the first decade except for PNV and B/C which reflect the entire planning horizon. All dollar figures are in 1982 terms except for those shown for the FY 1985 budget.

			Timber Sale Volume																
	1/ PNV MM$	2/ B/C	3/ X06 MMCF	3/ X06 MMBF	4/ X07 MMCF	5/ X08 MMCF	SUM MMCF	6/ Tmbr Mgt M.AC.	7/ Harvest Method T-SS-LSH M.Ac/Yr	8/ Prchsr Credit Roads MM$	8A/ Plt Ac.	9/ E04 Acres	10/ TSI Ac	11/ Tmbr Rltd Bdgt MM$	12/ Sum Bdgt MM$	Jobs	Prsnl Incom MM$	Pmts To Cnts MM$
Historical Levels																		
Latest FY 1985 Budget			22.8	127	8.6	5	36.4				2407	4731	3230		19.4			
Recent Historical			28.6	159	9.6	5	43.2					3253	3942	8.9	23.1	3633	60.0	3.678
Alternatives																		
A (Current Direction)	556	2.12	28	139	8	5	41	862	16-5-1	3.3	3436	4909	7332	11.4	21.2	3526	56.7	4.370
B (RPA)	629	2.26	32	158	9	5	46	875	18-4-0	2.9	2804	4005	7808	11.3	22.3	3757	61.3	5.028
B-Departure (FPFO) 13/	468	1.75	36	179	10	5	51	937	15-11-3	4.7	5902	8432	10154	16.0	22.9	3995	66.2	4.615
C (Proposed Action)	598	2.26	28	143	8	5	41	832	16-5-1	3.2	3221	4602	6758	11.0	21.7	3580	57.7	4.483
C-Departure	586	2.17	36	177	10	5	51	843	22-8-2	4.6	4029	5755	6599	14.3	25.8	3991	66.0	5.318
D	598	2.21	30	149	8	5	43	844	17-5-1	3.1	3046	4351	7473	11.3	22.0	3657	59.2	4.675
E	606	2.26	29	145	8	5	42	802	16-3 0	2.7	2945	4207	8069	10.8	21.4	3590	58.0	4.643
F	574	2.40	22	100	6	5	33	788	13-3-1	2.3	3030	4329	1442	8.2	18.0	3064	42.5	3.231
G	651	2.55	26	127	7	5	38	801	14-2-0	2.1	2178	3111	4910	8.3	18.4	3381	53.8	4.189
H	620	2.43	25	123	7	5	37	784	14-3-0	2.4	2208	3154	5392	8.7	18.9	3339	53.0	3.928

1/ Present net value for 15 decades.
2/ Benefit:cost ratio for 15 decades.
3/ Sawtimber - This is the volume of softwood sawlogs and veneer bolts sold.
4/ Roundwood - This is the volume of softwood roundwood other than sawtimber and fuelwood.
5/ Softwood personal use fuelwood.
6/ M.acres which come into solution for timber management during the first 15 decades.
7/ Harvest method -- Tractor:Shortspan Cable:Longspan Cable and Helicopter -- in percent.
8/ Purchaser credit road expenditures in millions of dollars.
8A/ Acres planted. This figure is also included in the total amount of reforestation activity shown in 9/.
9/ Reforestation - Includes all acres where activities aiding the reestablishment of a tree cover are employed; includes 8A/.
10/ Precommercial thinning acres.
11/ Total timber-related budget including other resource support for the timber program.
12/ Total Forest budget. Includes $1.14 million annually for construction of capital investments as designated in the HCNRA Comprehensive Management Plan in all alternatives except Alternative A. Latest FY 1985 budget includes $1.5MM(PCR).
13/ Alternative formulated to meet timber output levels prescribed by "Forestry Program for Oregon".

Table B-31
PROPOSED TIMBER HARVEST PER YEAR

Decade	Component	Recent Levels 1979-1983		ALTERNATIVES A		B		B-dep		C		C-dep		D		E		F		G		H	
		MMCF	MMBF	MMCF	MMBF	MMCF	MMCF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF	MMCF	MMBF
	Sawtimber																						
1	P,D,F,S,L 1/	28.0	155	21.8	121	24.7	138	28.1	157	23.3	129	27.7	152	23.4	130	23.0	128	14.6	80	20.3	112	19.3	106
	LP 2/	0.6	4	6.4	18	7.2	20	7.9	22	5.0	14	8.8	25	6.8	19	6.1	17	6.9	20	5.2	15	5.9	17
	Roundwood 3/ 4/	9.6		7.8		8.8		9.9		7.8		10.1		8.3		8.0		5.9		7.0		6.9	
	Fuelwood 4/	5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0	
	Total	43.2	159	41.0	139	45.7	158	50.9	179	41.1	143	51.6	177	43.5	149	42.1	145	32.4	100	37.5	127	37.1	123
	Sawtimber																						
2	P,D,F,S,L 1/			23.2	128	26.0	143	36.0	198	21.4	118	20.9	115	26.9	148	24.3	134	16.0	99	25.2	139	20.6	113
	LP 2/			5.0	14	5.9	17	1.2	3	6.9	19	5.7	16	3.3	9	4.8	13	3.5	10	0.3	1	4.6	13
	Roundwood 3/ 4/			6.5		7.4		8.6		6.5		6.2		7.0		6.7		5.0		5.9		5.8	
	Fuelwood 4/			5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0	
	Total			39.7	142	44.3	160	50.8	201	39.8	137	37.8	131	42.2	157	40.8	147	31.5	109	36.4	140	36.0	126
	Sawtimber																						
3	P,D,F,S,L 1/			26.7	147	31.7	174	39.5	217	28.1	155	26.5	146	30.1	165	28.9	159	17.0	94	25.5	139	24.9	137
	LP 2/			1.5	4	0.2	1	0.2	1	0.2	1	0.1	1	0.1	1	0.2	1	4.5	13	0.1	1	0.3	1
	Roundwood 3/ 4/			5.2		5.8		7.3		5.2		4.9		5.5		5.3		3.9		4.7		4.6	
	Fuelwood 4/			5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0	
	Total			38.4	151	42.7	175	52.0	218	38.5	156	36.5	147	40.7	166	39.4	160	30.4	107	35.3	140	34.8	138
	Sawtimber																						
4	P,D,F,S,L 1/			20.2	111	29.2	161	24.6	135	22.6	124	23.3	128	28.1	155	25.3	139	17.3	95	20.8	114	24.1	133
	LP 2/			8.0	22	2.7	8	16.4	46	5.7	16	3.3	10	2.1	6	3.8	11	4.2	12	4.7	13	1.1	3
	Roundwood 3/ 4/			5.2		5.8		7.5		5.2		4.9		5.5		5.3		3.9		4.7		4.6	
	Fuelwood 4/			5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0	
	Total			38.4	133	42.7	169	53.5	181	38.5	140	36.5	138	40.7	161	39.4	150	30.4	107	35.2	127	34.8	136
	Sawtimber																						
5	P,D,F,S,L 1/			22.2	122	26.7	147	24.4	134	21.3	117	21.3	117	27.6	152	21.8	110	20.8	114	21.6	119	23.0	126
	LP 2/			6.0	17	5.2	15	16.6	47	7.0	20	5.3	15	2.6	7	7.3	21	0.7	1	3.9	11	2.2	6
	Roundwood 3, 4/			5.2		8.8		7.5		5.2		4.9		5.5		5.3		3.9		4.7		4.6	
	Fuelwood 4/			5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0	
	Total			38.4	139	45.7	162	53.5	181	38.5	137	36.5	132	40.7	159	39.4	131	30.4	115	35.2	130	34.8	132

1/ Tree species other than lodgepole pine (P - ponderosa pine, D - Douglas-fir, F - true fir, S - Engelmann spruce, L - western larch). Regulated volume - included in allowable sale quantity.

2/ Lodgepole pine exceeding five inches in diameter. Regulated volume - included in allowable sale quantity.

3/ Volume other than fuelwood or sawtimber; includes cull material, small diameter (less than five inches) material, and dead lodgepole pine. Unregulated volume - not included in the allowable sale quantity.

4/ No board foot volume is shown since these products are normally not sawn into boards and are not sold on a board foot basis.

The term accessibility reflects on the stand's proximity to the established road system and to the local processors, as well as to the site-specific characteristics which determine to a great extent what logging systems may be employed. Timber values are adjusted within FORPLAN to reflect differences in net value which result from using more costly logging systems as opposed to less costly logging systems.

3. Costs

With the exception of Alternative A, which alone has a budget constraint at recent historical levels, all alternatives provide for constructing all capital improvements specified in the Hells Canyon National Recreation Area Comprehensive Management Plan in as close to the specified time frame as is possible. Alternative A reflects the historical record of accomplishments and stretches out the completion date for these projects well into the future. Thus all other alternatives experience a sharp drop in HCNRA CMP-related expenditures in the second decade.

In those alternatives which share identical FORPLAN input data (G, B, B-departure--H, C, C-departure) parallels exist. In both land allocation groups, costs increase as the timber target is increased. Moreover, these increased costs are not matched by increased benefits; the net effect being that net cash flow decreases. Extra costs occasioned by the timber targets largely take the form of increased planting incidence (rather than relying on natural regeneration); increased precommercial thinning incidence (rather than settling for the reduced yields accompanying some stagnated stands); and road costs to access areas determined to be economically inefficient to enter.

4. Disaggregation of Benefits Between Those with Market Values and Those Without

Some Forest outputs, such as stumpage, are normally traded in the market place and are therefore said to have market values. Others, such as hiking, are not and therefore have been assigned values. The fact that one is not exchanged in the market place does not make it valueless. Table B-32 provides a breakout of total Forest benefits by these categories. The most noticeable feature portrayed there is that while total market resource values vary substantially between the alternatives--by as much as 64 percent, total nonmarket resource values vary hardly at all--with a maximum variation of 5 percent. Variation in total market value has already been explained in the preceding passages dealing with variations in stumpage values and permittee grazing fees.

Nonmarket resource values change little because Forest Plan alternatives do not change the Forest character to the extent that marked shifts in recreation are expected. For instance,

TABLE B-32
UNDISCOUNTED AVERAGE ANNUAL FIRST DECADE ECONOMIC BENEFITS FOR BOTH MARKET AND NONMARKET RESOURCES
1982 MILLION DOLLARS

Alternative	G	B	H	E	C	D	C-dep	F	A 1/	B-dep 2/
Present Net Value	651	629	620	606	598.2	598.1	586	574	556	468
Average Annual Market Resource 3/ Values, Undiscounted, for the First Decade	16.9	19.7	15.7	17.9	17.3	18.2	20.2	12.1	16.6	16.3
Average Annual Non-Market Resource 4/ Values, Undiscounted, for the First Decade	19.7	19.7	19.8	19.7	19.8	19.7	20.4	20.0	19.8	19.4
Total Average Annual Undiscounted Resource Values, for the First Decade	36.6	39.4	35.5	37.6	37.1	37.9	40.6	32.1	36.4	35.7

1/ Alternative A cannot be implemented without change to existing Federal legislation. It does not meet Minimum Management Requirements for wildlife.

2/ Alternative B-dep cannot be implemented without change to Federal legislation. It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting.

3/ High bid stumpage values, grazing receipts, anadromous fish, and miscellaneous receipts.

4/ Recreation and water.

all the Forest Plan Alternatives call for protection, maintenance, and expansion of developed recreation sites so that no variation in developed recreation site use is attributed to any alternative. Some Forest dispersed recreation is expected to shift between recreation opportunity spectrum (ROS) classes--from semiprimitive motorized to roaded natural, for instance--but that recreation is expected to shift ROS classes and not be lost to the Forest. Some recreationists may be especially sensitive to the criterion differences between the two ROS categories and may no longer choose this Forest for recreation. The Forest can also reasonably be expected to gain some recreational activity for those who feel otherwise. Overall, these changes will occur gradually over a span of decades that will slowly change the recreationists' perceptions of the Forest's recreation opportunities. During this timespan other Forests and other lands will be changing, along with society as a whole. Recreationists might be willing to accept more users in any ROS category without abandoning the area.

The one recreation category identified as changing between alternatives is that associated with big-game hunting outside designated wilderness. Changes made reflect anticipated changes in big-game numbers resulting from such disparate conditions as thermal cover, hiding cover, and open roads. These factors are in turn affected by whether timber is logged, how and how rapidly the lands are reforested, how the timber is accessed, and so on. Maximum variation between the most widely divergent alternatives amounts to 8 percent in decade one and increases to 16 percent by decade three. Generally the Forest alternatives are arrayed with Alternative F being the best for big-game habitat and with no Forest alternative being worse for big-game habitat than is Alternative B-departure.

6. Incremental Differences in Economic Efficiency Criteria

A wealth of information is contained in Tables B-33, B-34, and B-35. Because the information is summary in nature, explanation is indicated. The max PNV benchmark is the starting point for the review. It provides a reference point as the benchmark which most closely approximates an alternative. Alternative G generated the highest present net value for any alternative because its land allocation offered the least in the way of constraints to timber production; because it continued livestock grazing at recent historical levels; and because it was not required to harvest uneconomical timber stands. It forms the true base of comparison for the alternatives because it comprises a fully implementable alternative.

Table B-33
NONCASH BENEFITS FOR DECADES 1, 2, 5 AND 6
1982 MILLION DOLLARS
(Ranked In Order Of Decreasing Present Net Value)

Alternative	G	B	H	E	C	D	C-dep	F	A 1/	B-dep 2/
Present Net Value	651	629	620	606	598.2	598.1	586	574	556	468
Decade 1										
Willingness-To-Pay Values for Forest Outputs 3/	36.6	39.4	34.4	37.6	37.1	37.9	40.6	32.1	36.4	35.7
Forest Receipts 4/	13.6	15.5	12.1	13.9	12.8	13.7	14.3	8.8	12.0	10.3
Noncash Benefits 5/	23.0	23.9	22.3	23.7	24.3	24.2	26.3	23.3	24.4	25.4
Jobs/Year	3,381	3,757	3,339	3,590	3,580	3,657	3,991	3,064	3,526	3,995
Personal Income (Million $/Year)	53.8	56.7	53.0	58.0	57.7	59.2	66.0	47.5	56.7	66.2
Decade 2										
Willingness-To-Pay Values for Forest Outputs 3/	40.9	42.8	39.1	41.3	39.9	40.9	38.0	36.7	39.4	45.7
Forest Receipts 4/	14.7	16.3	12.6	14.9	13.4	14.1	11.8	9.6	12.4	18.0
Noncash Benefits 5/	26.2	26.5	26.5	26.4	26.5	26.8	26.2	27.1	27.0	27.7
Decade 5										
Willingness-To-Pay Values for Forest Outputs 3/	51.9	53.5	50.9	47.7	48.1	48.1	47.6	50.1	42.1	39.5
Forest Receipts 4/	18.9	19.3	16.9	14.0	13.8	13.8	13.5	16.0	7.9	0.8
Noncash Benefits 5/	33.0	34.2	34.0	33.7	34.3	34.3	34.1	34.1	34.2	38.7
Decade 6										
Willingness-To-Pay Values for Forest Outputs 3/	50.5	51.2	49.4	48.5	49.6	48.6	48.0	51.4	47.7	44.8
Forest Receipts 4/	17.0	17.6	15.8	15.4	15.9	15.3	14.3	17.6	14.5	11.5
Noncash Benefits 5/	33.5	33.6	33.6	33.1	33.7	33.3	33.7	33.8	33.2	33.3

1/ Alternative A cannot be implemented without change to existing Federal legislation. It does not meet minimum management requirements for wildlife.

2/ Alternative B-dep cannot be implemented without change to Federal legislation. It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting.

3/ Undiscounted benefits from all Forest outputs quantified including those in 4/ below as well as benefits accruing from recreation, water, and anadromous fish.

4/ Statistical high bid stumpage values, grazing receipts, and miscellaneous receipts.

5/ Noncash benefits are not collected as fees because of current laws and policies.

Table B-34
PRESENT NET VALUE, DISCOUNTED BENEFITS, AND DISCOUNTED COSTS BY RESOURCE GROUPS 1/
1982 MILLION DOLLARS

Alternative	G	B	H	E	C	D	C-dep	F	A 2/	B-dep 3/
Present Net Value	651	629	620	606	598.2	598.1	586	574	556	468
Discounted Benefits										
Timber	430	479	403	435	417	439	424	325	381	447
Recreation	589	589	595	596	595	591	600	608	600	585
Range	35	40	33	34	39	40	39	30	35	40
Other 4/	18	22	23	20	22	21	22	20	15	22
Total	1,072	1,130	1,054	1,085	1,073.7	1,090.7	1,085	983	1,031	1,094
Discounted Costs										
Timber 5/	90	132	101	127	121	131	130	94	130	186
Roads 6/	145	172	147	163	163	170	176	136	161	235
Recreation 7/	41	46	45	45	45	43	45	45	39	46
Range 8/	21	21	17	18	20	21	20	15	21	23
Other 9/	124	130	124	126	126	128	129	119	125	136
Total	421	501	434	479	475.0	492.6	500	409	476	626

1/ Direct comparisons of benefits and costs displayed for individual resource outputs provide general indications of relationships but they may be misleading because many outputs in multiple use have common costs of production that cannot be reliably separated and attributed to individual resources. Displayed in order of decreasing present net value.

2/ Alternative A cannot be implemented without change to existing Federal legislation. It does not meet minimum management requirements for wildlife.

3/ Alternative B-dep cannot be implemented without change to Federal legislation. It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting.

4/ Primarily water, but also anadromous fish and miscellaneous collections.

5/ Costs shown are for E-prefixed MIH codes. As discussed in Appendix B, timber-related costs include many outside the formally designated timber program.

6/ Costs shown are those related to the Forest facilities program, the bulk of which is a cost to the timber program.

7/ Costs shown are those from the Forest's recreation, wilderness and fish and wildlife programs costs.

8/ Costs shown are those from the livestock grazing program.

9/ Costs shown are those from the Forest programs not elsewhere classified. The bulk of these costs are associated with the timber program.

Table B-35
PRESENT NET VALUE OF ALTERNATIVES AND RELATED ECONOMIC CRITERIA
1982 MILLION DOLLARS
4% DISCOUNT RATE FOR 150 YEARS
(Ranked in Order of Decreasing Present Net Value)

	Max PNV Benchmark	ALTERNATIVE G	B	H	E	C	D	C-dep	F	A 1/	B-dep 2/
Present Value of Benefits	1,102	1,072	1,130	1,054	1,084	1,073.2	1,090.7	1,086	983	1,031	1,094
Present Value of Costs	433	421	501	434	479	475.0	492.6	500	409	476	626
Present Net Value	669	651	629	620	606	598.2	598.1	586	574	556	468

1/ Alternative A cannot be implemented without change to existing Federal legislation. It does not meet minimum management requirements for wildlife.

2/ Alternative B-dep cannot be implemented without change to Federal legislation. It violates NFMA requirements that stands shall generally have achieved culmination of mean annual increment (CMAI) before harvesting.

Moving from Alternative G to Alternative B entails loss of some $22 million in present net value. The increase in discounted costs (plus $80 million) far outstripped the increase in discounted benefits (plus $58 million). Significant benefit increases occurred in timber (plus $49 million) and range (plus $5 million) outputs. The range improvements necessary to accommodate livestock at Alternative B's levels were more economically efficient than remaining at recent historical levels but this small increase to present net value was greatly overshadowed by increased costs in the timber (plus $42 million), roads (plus $27 million), and other programs (plus $6 million). As would be expected, the benefit cost ratio declined from Alternative G's 2.55 to Alternative B's 2.26.

The reason Alternative B has a lower present net value and a lower benefit cost ratio than Alternative G is that Alternative B offers more timber than is economically efficient. This is reflected in a higher incidence of lodgepole pine sawtimber logging and also a higher incidence of logging in the first decade on short-span, long-span and helicopter lands. The timber harvest floors were established to make the alternative responsive to the timber issue in this commodity emphasis alternative.

Selecting Alternative H rather than Alternative B would mean moving to a different land allocation, one significantly more attuned to amenities. Making this move would mean picking up some benefits in recreation (plus $6 million) due to increased big-game numbers; making a very small reduction in range benefits (minus $1 million) and a large reduction of $76 million in timber benefits. The reductions in costs associated with the timber program (minus $31 million) and timber related activities in roads (minus $25 million) and other programs (minus $6 million) were not sufficient to overcome the even greater losses in benefits. Even so, the differences between Alternatives B and H is quite small in present net value terms (though very great in other respects) and Alternative H actually returns more per dollar invested than does Alternative B (2.42 compared to Alternative B's 2.26).

Logic would indicate that had both of these alternatives been run with identical timber targets (in terms of percent of alternative-respective maximum possible first-decade offerings) that the spread between the two would widen appreciably. As stated, Alternative B's timber target was 85 percent of its maximum possible first-decade offering, while Alternative H (with a more restrictive land allocation) was assigned a target of 80 percent. Alternative H's less intensive range program offers no clearcut advantage over Alternative B's in terms of present net value though it would look attractive in times of austere budgets. Alternative H manages to increase recreation-related benefits and decrease recreation-related costs relative to Alternative B by spreading out some of the program's investments over time.

Alternative E has, in the balance, a less restrictive land allocation than does Alternative H. We can deduce this from the fact that it is able to generate a higher level of timber than does Alternative C, with the same 90 percent of maximum possible timber production target, and generate a higher level of present net value. It ranks lower than Alternative H, which shares Alternative C's land allocations, because Alternative H's timber target was only 80 percent of its maximum possible for the first decade.

Alternative E's reduction in present net value of $14 million occurs because its $30 million increase in benefits causes a disproportionately large increase in costs of $45 million. Thus, while timber (plus $32 million) and recreation (plus $1 million) benefits increased; range (minus $1 million) and other programs (minus $3 million) decreased. The small reductions in range costs (minus $1 million) were offset by increased costs in timber (plus $26 million), roads (plus $16 million), and other programs (plus $2 million).

Next in line in terms of overall efficiency is Alternative C with a present net value reduction of $8 million, though its benefit cost ratio remains the same at 2.26. Costs fall by some $4 million; the benefits fall even farther, by $11 million. The reduction in benefits comes about exclusively from a lower value of timber offerings (minus $18 million) along with a slight reduction (minus $1 million) in recreation activity. These reductions were offset to some extent by increased range benefits (plus $5 million) and increased benefits from other programs (plus $2 million). Cost reductions in timber of $6 million were offset to an extent by increases in range program costs (plus $2 million).

Alternative D's present net value is less than one-tenth of one percent lower than that of Alternative C. Its costs and benefits both increase by $18 million so its benefit cost ratio necessarily declines. Significant increases in timber harvest benefits (plus $22 million) and a small increase in range benefits (plus $1 million) are offset somewhat by reduced recreation benefits (minus $4 million) and other program benefits (minus $1 million). A small reduction in costs for recreation (minus $2 million) is overshadowed by cost increases in timber (plus $10 million), roads (plus $7 million), range (plus $1 million), and other programs (plus $2 million).

Because Alternatives C and D have essentially the same present net value, Alternative C-departure is compared to Alternative C for clarity of expression. Put basically, Alternative C-departure generates a lower present net value than does Alternative C because it has a higher timber target and thus forces the model to harvest timber in a less economical manner. These timber targets cause a $12 million reduction in present net value--the result of a $5 million decrease in benefits and a $7 million increase in costs.

As shown in Table B-35, this is the only instance in which a successively ranked alternative manages to both decrease benefits and increase costs. The situation arises because, with its somewhat restrictive land allocations and quite high first decade timber harvests, the model is forced to harvest much more lodgepole sawtimber in the first decade (8.8 MMCF compared to 5.0 MMCF) and also to move very heavily into difficult-to-log lands even in the first decade--harvesting about 8,000 acres of short-span ground compared to Alternative C's 5,000 acres and harvesting twice as much helicopter-long-span acreage. Another effect of this change is that average volumes removed per acre falls from 6.5 MBF per acre to 5.5 MBF per acre. The effect on the benefit side of the equation is that total timber benefits increase some $7 million and recreation benefits some $5 million. This is one of those instances in which an increased timber harvest in the first decade actually serves to improve big-game habitat. Timber related costs, however, increase: timber (plus $9 million), roads (plus $13 million), and other programs (plus $3 million).

Alternative F provides the sharpest drop in timber benefits between any successively ranked alternatives (minus $99 million). Range benefits are also reduced (minus $9 million) as are other programs (minus $2 million), but recreation benefits increase $8 million. A long string of cost reductions contribute to the total $91 million cost reduction: timber (minus $36 million), roads (minus $40 million), range (minus $5 million), and other programs (minus $10 million). The primary reason for the decline in overall present net value is that this land allocation is the most restrictive in terms of timber harvesting. This coupled with a high timber target, 90 percent of its maximum possible for the first decade on a nondeclining flow basis, to generate the lower present net value.

Alternative A has the highest nondeparture first-decade timber target expressed as a percentage of its maximum possible first-decade offerings--99 percent. This target was assigned to enable the alternative to approximate to the fullest extent possible, both the existing land allocation and recent historical timber offerings. Coupled with the second most restrictive land allocation, this resulted in the lowest present net value generated for any nondeparture alternative (556 million). This was the net result of the $48 million increase in benefits being overshadowed by a $67 million increase in costs. The benefits themselves were the net result of a $56 million increase in timber, an $8 million decrease in recreation, a $5 million increase in range, and a $5 million reduction in other programs.

The largest incremental increase in discounted economic costs (plus $150 million) and the sharpest falldown in incremental present net value (minus $88 million) are recorded by Alternative B-departure. It also manages the largest incremental increase in discounted economic benefits (plus $63 million). Benefits do increase in other programs by $7 million, but this is largely the result of budget constraint-induced reductions in Alternative A, the basis for comparison. Range, at its highest permitted levels, increases those benefits by $5 million. The timber program increased its benefits by $66 million, the result of operating with the least constrained timber land allocation. Recreation benefits fall by $15 million to their lowest levels because this alternative is the most disruptive to big game habitat. Predictably, the only cost center which declines is that for recreation (down $3 million dollars) while timber increases $56 million, roads $74 million, range $2 million, and other programs $11 million.

E. Implications of FORPLAN Runs on Current Management Direction

Certainly the most obvious implication is that the Forest is harvesting timber at rates in excess of those which economic efficiency would indicate. Whereas recent offering levels for sawtimber on the Forest have been at 159 MMBF, FORPLAN selected far less, 139 MMBF, even when directed to harvest timber at levels far in excess of those indicated by economic efficiency criteria. Another observation is that the Forest has moved into more costly logging systems more rapidly than efficiency would indicate. This appears to have occurred as management has sought to harvest difficult ground to establish empirically its economic suitability for timber production and to meet the intent of unit plans to distribute the harvest.

The analysis done for this plan indicates that the local economy and the Federal Treasury would have been better off had the Forest managed its easily-logged, high-valued stands more intensively rather than moving so quickly into the more difficult-to-log stands. Adopting the practice of more intensive management of easily-logged land in the immediate future would also allow the Forest to benefit from refinements in technology developed elsewhere to log difficult sites. Thus, the Forest could, in the future, reap the benefits of research and development (R & D) done elsewhere. Logging the more difficult lands now means that the Forest, the local economy, and the Federal Treasury are helping pay the cost of R & D in the form of lower stumpage values.

Other salient features revealed in the analysis include projection of sizeable increases in precommercial thinning (rising especially from the clearcuts of dead and dying lodgepole pine); the increased use of regeneration harvests rather than partial harvests; the reduced incidence of planting as a means to achieve regeneration; the reduction to insignificant levels of the incidence of commercial thinning on regenerated stands; and acceptance of regeneration lags well in excess of five years.

F. Analysis of Constraints Within and Between Alternatives

Tables B-36 through B-45 display the trade-offs associated with each of the major other resource objectives expressed as FORPLAN constraints. These are compared to the maximize present net value benchmark and the next most similar alternative.

Alternative A represents the current situation. The constraints are compared to the max present net value benchmark and to Alternative C which is a somewhat more commodity-oriented alternative. Substantial acreages in Alternative A have a wildlife emphasis so this alternative most nearly maintains current elk numbers and most nearly approximates the achievement of Oregon Department of Fish and Wildlife objectives for elk over the next 50 years.

Alternative B adds the Hells Canyon National Recreation Area Comprehensive Management Plan, some consideration for visual quality along the highly sensitive travel routes, and some additional consideration for big-game winter range beyond that provided by minimum management requirements.

Alternative E adds to the acreage maintained in roadless recreation in Alternative B. This serves to satisfy questions raised as to what we could maintain in an undeveloped condition if we just managed lands that are currently available to us in an intensive manner. This increment resulted in a reduction of present net value for 15 decades of 30.6 million dollars and in timber output the first decade of 28.6 million cubic feet.

Alternative G adds a constraint to limit prescriptions to only those producing a positive rate of return in the Alternative B model formulation. All other resource constraints are maintained as in the Alternative B model formulation, but a higher economic efficiency is sought through managing only lands that produce a positive rate of return without predetermined timber output level. This results in a reduction in first decade allowable sale quantity of 31.6 million cubic feet, but increases the present net value for 15 periods by 20.7 million dollars.

Alternative D adds some high quality roadless or undeveloped area around the fringe of the Eagle Cap Wilderness and in the Elkhorn Mountains to the undeveloped dispersed recreation strategy. It provides for additional old-growth to enhance successional stage diversity within community types, and the viability of associated wildlife indicator species. It also seeks to manage elk and deer winter range to nearly optimum habitat conditions, thereby providing high quality elk habitat through the critical winter and spring periods and coming closer to providing the potential for maintaining current Oregon Department of Fish and Wildlife elk objectives. Opportunity costs in terms of timber volume and the present net value of timber foregone are displayed in Table B-41, compared to both the max present net value benchmark and to Alternative B.

Alternative C adds optimum habitat objectives on selected elk summer ranges and protection for certain key anadromous fisheries streams along the Elkhorn Range to the other resource objectives found in Alternative D. Table B-39 compares the opportunity costs of the present net value of timber foregone and cubic feet of timber foregone to present net value Benchmark 7 and to Alternative D.

Alternative H maintains the other resource objectives of Alternative C, but seeks increased economic efficiency by reducing the objective first decade output. Apparent opportunity costs associated with maintaining these resource objectives and with achieving this level of timber output are displayed in Table B-45.

Alternative F seeks to provide near optimum habitat conditions for elk across the entire managed portion of the Wallowa-Whitman National Forest. It provides as near current levels of old-growth as is possible, given volumes planned to be under contract at the start of this plan. As a result, it is an incremental step from C, though it adds several elements at the same time. Opportunity costs or tradeoffs are displayed in Table B-43 comparing this alternative with max present net value benchmark and with Alternative C.

Table B-36
TIMBER TRADEOFFS FOR ALTERNATIVE CONSTRAINTS 1/
--ALTERNATIVE A--

Management Strategy/Constraint	Total Acres 2/	Suitable Acres	Alt A vs Run #7 MMCF	Alt A vs Run #7 MM$ 3/	Alt A vs Alt C MMCF	Alt A vs Alt C MM$ 3/
MS-1 (MMR Hrvst Dispersion)	386838	316321	0	0	0	0
MS-2 (Modified Timber Emph)	NA 4/					
MS-3 (Big Game Emphasis)	682069	398542	-31.7	-36.3	-8.5	-9.7
MS-5 (Phillips Lake)	2971	1743	-0.3	-0.4	0	0
MS-6 (Undeveloped Disp Rec)	135930	47391	-17.5	-27.8	-7.3	-11.7
MS-9 (NRA Disp Rec/Native Veg)	157739	44542	-11.8	-28.0	0	0
MS-10 (NRA Forage Production)	130133	45614	-12.1	-28.6	0	0
MS-11 (NRA Disp Rec/Timber)	75653	57727	-5.5	-16.6	0	0
MS-12 (Indian Cr Res Nat Area)	965	870	0	0	0	0
MS-14 (Starkey Experimental For)	27123	15506	0	0	0	0
MS-15 (Old-Growth)	61382	41757	-5.0	-8.0	-1.3	-2.1
MS-16 (Admin Sites, Rec Sites) 5/	3742	2010	-0.7	-1.2	0	0
MS-18 (Anadromous Fish Habitat)	NA	NA				
Riparian	19759	19759	0	0	0	0
Visual Foreground	55816	55816	-10.1	-11.9	0	0
Visual Middle Ground	75060	75060	-3.6	-5.0	0	0

1/ Tradeoffs are in excess of those generated by the MMR's which are already a part of Benchmark Run #7. These tradeoffs are discussed as part of the analysis prior to alternative formulation.

2/ Total acres of a given management emphasis includes acres not suitable or not cost effective for timber management. Tradeoffs calculated on suitable timbered acres. Acres relate to FORPLAN reports. Acres differ from those shown in alternatives because of the need to represent certain prescriptions as management emphases in FORPLAN that are part of other management strategies in alternatives. (Riparian and visual management emphases are prescriptions within MS-1, MS-2 and MS-3.)

3/ Economic data are from FORPLAN and are therefore exclusive of nontimber considerations.

4/ NA - Management emphasis is not applicable in this alternative.

5/ Includes "a lake" and "recsite" management emphasis in FORPLAN.

Table B-37
TIMBER TRADEOFFS FOR ALTERNATIVE CONSTRAINTS 1/
--ALTERNATIVE B--

Management Strategy/Constraint	Total Acres 2/	Suitable Acres	Alt B vs Run #7		Alt B vs Alt A	
			MMCF	MM$ 3/	MMCF	MM$ 3/
MS-1 (MMR Hrvst Dispersion)	862407	623934	0	0	0	0
MS-2 (Modified Timber Emph)	347133	172788	-7.0	-11.9	+24.7	+24.4
MS-3 (Big Game Emphasis)	NA /4	NA				
MS-5 (Phillips Lake)	2971	1743	-0.3	-0.4	0	0
MS-6 (Undeveloped Disp Rec)	60750	0	0	0	+17.5	+27.8
MS-9 (NRA Disp Rec/Native Veg)	157739	44542	-11.8	-28.0	0	0
MS-10 (NRA Forage Production)	130133	45614	-12.1	-28.6	0	0
MS-11 (NRA Disp Rec/Timber)	75653	57727	-5.5	-16.6	0	0
MS-12 (Indian Cr Res Nat Area)	965	870	0	0	0	0
MS-14 (Starkey Experimental For)	27123	15506	0	0	0	0
MS-15 (Old Growth)	28184	28184	0	0	+5.0	+8.0
MS-16 (Admin Sites, Rec Sites) 5/	3742	2010	-0.7	-1.2	0	0
MS-18 (Anadromous Fish Habitat)	NA	NA				
Riparian	19759	19759	0	0	0	0
Visual Foreground	23044	23044	-4.2	-4.9	+5.9	+7.0
Visual Middle Ground	12747	12747	0	0	+3.6	+5.0

1/ Tradeoffs are in excess of those generated by the MMR's which are already a part of Benchmark Run #7. These tradeoffs are discussed as part of the analysis prior to alternative formulation.
2/ Total acres of a given management emphasis includes acres not suitable or not cost effective for timber management. Tradeoffs calculated on suitable timbered acres. Acres relate to FORPLAN reports. Acres differ from those shown in alternatives because of the need to represent certain prescriptions as management emphases in FORPLAN that are part of other management strategies in alternatives. (Riparian and visual management emphases are prescriptions within MS-1, MS-2 and MS-3.)
3/ Economic data are from FORPLAN and are therefore exclusive of nontimber considerations.
4/ NA - Management emphasis is not applicable in this alternative.
5/ Includes "a lake" and "recsite" management emphasis in FORPLAN.

Table B-38
TIMBER TRADEOFFS FOR ALTERNATIVE CONSTRAINTS 1/
--ALTERNATIVE B-DEPARTURE--

Management Strategy/Constraint	Total Acres 2/	Suitable Acres	Alt B/Dep vs Run #7 MMCF	Alt B/Dep vs Run #7 MMCF	Alt B/Dep vs Alt A MMCF	Alt B/Dep vs Alt A MM$ 3/
MS-1 (MMR Hrvst Dispersion)	862407	623934	0	0	0	0
MS-2 (Modified Timber Emph)	347133	172788	-7.0	-11.9	+24.7	+24.4
MS-3 (Big Game Emphasis)	NA /4	NA				
MS-5 (Phillips Lake)	2971	1743	-0.3	-0.4	0	0
MS-6 (Undeveloped Disp Rec)	60750	0	0	0	+17.5	+27.8
MS-9 (NRA Disp Rec/Native Veg)	157739	44542	-11.8	-28.0	0	0
MS-10 (NRA Forage Production)	130133	45614	-12.1	-28.6	0	0
MS-11 (NRA Disp Rec/Timber)	75653	57727	-5.5	-16.6	0	0
MS-12 (Indian Cr Res Nat Area)	965	870	0	0	0	0
MS-14 (Starkey Experimental For)	27123	15506	0	0	0	0
MS-15 (Old Growth)	28184	28184	0	0	+5.0	+8.0
MS-16 (Admin Sites, Rec Sites) 5/	3742	2010	-0.7	-1.2	0	0
MS-18 (Anadromous Fish Habitat)	NA	NA				
Riparian	19759	19759	0	0	0	0
Visual Foreground	23044	123044	-4.2	-4.9	+5.9	+7.0
Visual Middle Ground	12747	12747	0	0	+3.6	+5.0

1/ Tradeoffs are in excess of those generated by the MMR's which are already a part of Benchmark Run #7. These tradeoffs are discussed as part of the analysis prior to alternative formulation.
2/ Total acres of a given management emphasis includes acres not suitable or not cost effective for timber management. Tradeoffs calculated on suitable timbered acres. Acres relate to FORPLAN reports. Acres differ from those shown in alternatives because of the need to represent certain prescriptions as management emphases in FORPLAN that are part of other management strategies in alternatives. (Riparian and visual management emphases are prescriptions within MS-1, MS-2 and MS-3.)
3/ Economic data are from FORPLAN and are therefore exclusive of nontimber considerations.
4/ NA - Management emphasis is not applicable in this alternative.
5/ Includes "a lake" and "recsite" management emphasis in FORPLAN.

Table B-39

TIMBER TRADEOFFS FOR ALTERNATIVE CONSTRAINTS 1/
--ALTERNATIVE C--

Management Strategy/Constraint	Total Acres 2/	Suitable Acres	Alt C vs Run #7 MMCF	Alt C vs Run #7 MM$ 3/	Alt C vs Alt D MMCF	Alt C vs Alt D MM$ 3/
MS-1 (MMR Hrvst Dispersion)	618569	434939	0	0	0	0
MS-2 (Modified Timber Emph)	NA /4	NA				
MS-3 (Big Game Emphasis)	499318	291492	-23.2	-26.5	-10.4	-11.8
MS-5 (Phillips Lake)	2971	1743	-0.3	-0.4	0	0
MS-6 (Undeveloped Disp Rec)	108780	27514	-10.1	-16.1	0	0
MS-9 (NRA Disp Rec/Native Veg)	157739	44542	-11.8	-28.0	0	0
MS-10 (NRA Forage Production)	130133	45614	-12.1	-28.6	0	0
MS-11 (NRA Disp Rec/Timber)	75653	57727	-5.5	-16.6	0	0
MS-12 (Indian Cr Res Nat Area)	965	870	0	0	0	0
MS-14 (Starkey Experimental For)	27123	15506	0	0	0	0
MS-15 (Old Growth)	38196	38196	-3.7	-5.0	0	0
MS-16 (Admin Sites, Rec Sites) 5/	3742	2010	-0.7	-1.2	0	0
MS-18 (Anadromous Fish Habitat)	6/	6/				
Riparian	19029	19029	0	0	0	0
Visual Foreground	57214	57214	-10.4	-12.2	0	0
Visual Middle Ground	76275	76275	-3.6	-5.1	0	0

1/ Tradeoffs are in excess of those generated by the MMR's which are already a part of Benchmark Run #7. These tradeoffs are discussed as part of the analysis prior to alternative formulation.

2/ Total acres of a given management emphasis includes acres not suitable or not cost effective for timber management. Tradeoffs calculated on suitable timbered acres. Acres relate to FORPLAN reports. Acres differ from those shown in alternatives because of the need to represent certain prescriptions as management emphases in FORPLAN that are part of other management strategies in alternatives. (Riparian and visual management emphases are prescriptions within MS-1, MS-2 and MS-3.)

3/ Economic data are from FORPLAN and are therefore exclusive of nontimber considerations.

4/ NA - Management emphasis is not applicable in this alternative.

5/ Includes "a lake" and "recsite" management emphasis in FORPLAN.

6/ Not differentiated from MS-6.

Table B-40
TIMBER TRADEOFFS FOR ALTERNATIVE CONSTRAINTS 1/
--ALTERNATIVE C-DEPARTURE --

Management Strategy/Constraint	Total Acres 2/	Suitable Acres	Alt C-Dep vs Run #7 MMCF	Alt C-Dep vs Run #7 MM$ 3/	Alt C-Dep vs Alt D MMCF	Alt C-Dep vs Alt D MM$ 3/
MS-1 (MMR Hrvst Dispersion)	618569	434939	0	0	0	0
MS-2 (Modified Timber Emph)	NA /4	NA				
MS-3 (Big Game Emphasis)	499318	291492	-23.2	-26.5	-10.4	-11.6
MS-5 (Phillips Lake)	2971	1743	-0.3	-0.4	0	0
MS-6 (Undeveloped Disp Rec)	108780	27514	-10.1	-16.1	0	0
MS-9 (NRA Disp Rec/Native Veg)	157739	44542	-11.8	-28.0	0	0
MS-10 (NRA Forage Production)	130133	45614	-12.1	-28.6	0	0
MS-11 (NRA Disp Rec/Timber)	75653	57727	-5.5	-16.6	0	0
MS-12 (Indian Cr Res Nat Area)	965	870	0	0	0	0
MS-14 (Starkey Experimental For)	27123	15506	0	0	0	0
MS-15 (Old Growth)	38196	33196	-3.7	-5.0	0	0
MS-16 (Admin Sites, Rec Sites) 5/	3742	2010	-0.7	-1.2	0	0
MS-18 (Anadromous Fish Habitat)	6/	6/				
Riparian	19029	19029	0	0	0	0
Visual Foreground	57214	57214	-10.4	-12.2	0	0
Visual Middle Ground	76275	76275	-3.6	-5.1	0	0

1/ Tradeoffs are in excess of those generated by the MMR's which are already a part of Benchmark Run #7. These tradeoffs are discussed as part of the analysis prior to alternative formulation.

2/ Total acres of a given management emphasis includes acres not suitable or not cost effective for timber management. Tradeoffs calculated on suitable timbered acres. Acres relate to FORPLAN reports. Acres differ from those shown in alternatives because of the need to represent certain prescriptions as management emphases in FORPLAN that are part of other management strategies in alternatives. (Riparian and visual management emphases are prescriptions within MS-1, MS-2 and MS-3.)

3/ Economic data are from FORPLAN and are therefore exclusive of nontimber considerations.

4/ NA - Management emphasis is not applicable in this alternative.

5/ Includes "a lake" and "recsite" management emphasis in FORPLAN.

6/ Not differentiated from MS-6.

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Table B-41
TIMBER TRADEOFFS FOR ALTERNATIVE CONSTRAINTS 1/
--ALTERNATIVE D--

Management Strategy/Constraint	Total Acres 2/	Suitable Acres	Alt D vs Run #7		Alt D vs Alt B	
			MMCF	MM$ 3/	MMCF	MM$ 3/
MS-1 (MMR Hrvst Dispersion)	790861	573315	0	0	0	0
MS-2 (Modified Timber Emph)	NA /4	NA				
MS-3 (Big Game Emphasis)	329496	161080	-12.8	-14.7	-5.8	-2.8
MS-5 (Phillips Lake)	2971	1743	-0.3	-0.4	0	0
MS-6 (Undeveloped Disp Rec)	108780	27514	-10.1	-16.1	-10.1	-16.1
MS-9 (NRA Disp Rec/Native Veg)	157739	44542	-11.8	-28.0	0	0
MS-10 (NRA Forage Production)	130133	45614	-12.1	-28.6	0	0
MS-11 (NRA Disp Rec/Timber)	75653	57727	-5.5	-16.6	0	0
MS-12 (Indian Cr Res Nat Area)	965	870	0	0	0	0
MS-14 (Starkey Experimental For)	27123	15506	0	0	0	0
MS-15 (Old Growth)	38196	38196	-3.7	-5.0	-3.7	-5.0
MS-16 (Admin Sites, Rec Sites) 5/	3742	2010	-0.7	-1.2	0	0
MS-18 (Anadromous Fish Habitat)	NA	NA				
Riparian	19029	19029	0	0	0	0
Visual Foreground	57214	57214	-10.4	-12.2	-6.8	-8.0
Visual Middle Ground	76275	76275	-3.6	-5.1	-3.6	-5.1

1/ Tradeoffs are in excess of those generated by the MMR's which are already a part of Benchmark Run #7. These tradeoffs are discussed as part of the analysis prior to alternative formulation.
2/ Total acres of a given management emphasis includes acres not suitable or not cost effective for timber management. Tradeoffs calculated on suitable timbered acres. Acres relate to FORPLAN reports. Acres differ from those shown in alternatives because of the need to represent certain prescriptions as management emphases in FORPLAN that are part of other management strategies in alternatives. (Riparian and visual management emphases are prescriptions within MS-1, MS-2 and MS-3.)
3/ Economic data are from FORPLAN and are therefore exclusive of nontimber considerations.
4/ NA - Management emphasis is not applicable in this alternative.
5/ Includes "a lake" and "recsite" management emphasis in FORPLAN.

Table B-42
TIMBER TRADEOFFS FOR ALTERNATIVE CONSTRAINTS 1/
--ALTERNATIVE E--

Management Strategy/Constraint	Total Acres 2/	Suitable Acres	Alt E vs Run #7		Alt E vs Alt B	
			MMCF	MM$ 3/	MMCF	MM$ 3/
MS-1 (MMR Hrvst Dispersion)	862407	623934	0	0	0	0
MS-2 (Modified Timber Emph)	308068	163478	-6.6	-11.3	+0.4	+0.6
MS-3 (Big Game Emphasis)	NA /4	NA				
MS-5 (Phillips Lake)	2971	1743	-0.3	-0.4	0	0
MS-6 (Undeveloped Disp Rec)	108780	83520	-30.5	-49.0	-28.1	-30.6
MS-9 (NRA Disp Rec/Native Veg)	157739	44542	-11.8	-28.0	0	0
MS-10 (NRA Forage Production)	130133	45614	-12.1	-28.6	0	0
MS-11 (NRA Disp Rec/Timber)	75653	57727	-5.5	-16.6	0	0
MS-12 (Indian Cr Res Nat Area)	965	870	0	0	0	0
MS-14 (Starkey Experimental For)	27123	15506	0	0	0	0
MS-15 (Old Growth)	23642	23642	0	0	0	0
MS-16 (Admin Sites, Rec Sites) 5/	3742	2010	-0.7	-1.2	0	0
MS-18 (Anadromous Fish Habitat)	NA	NA				
Riparian	16961	16961	0	0	0	0
Visual Foreground	21027	21027	-3.8	-4.5	+0.4	+0.4
Visual Middle Ground	12747	12747	0	0	0	0

1/ Tradeoffs are in excess of those generated by the MMR's which are already a part of Benchmark Run #7. These tradeoffs are discussed as part of the analysis prior to alternative formulation.
2/ Total acres of a given management emphasis includes acres not suitable or not cost effective for timber management. Tradeoffs calculated on suitable timbered acres. Acres relate to FORPLAN reports. Acres differ from those shown in alternatives because of the need to represent certain prescriptions as management emphases in FORPLAN that are part of other management strategies in alternatives. (Riparian and visual management emphases are prescriptions within MS-1, MS-2 and MS-3.)
3/ Economic data are from FORPLAN and are therefore exclusive of nontimber considerations.
4/ NA - Management emphasis is not applicable in this alternative.
5/ Includes "a lake" and "recsite" management emphasis in FORPLAN.

Table B-43
TIMBER TRADEOFFS FOR ALTERNATIVE CONSTRAINTS 1/
--ALTERNATIVE F--

Management Strategy/Constraint	Total Acres 2/	Suitable Acres	Alt F vs Run #7 MMCF	Alt F vs Run #7 MM$ 3/	Alt F vs Alt C MMCF	Alt F vs Alt C MM$ 3/
MS-1 (MMR Hrvst Dispersion)	NA /4	NA				
MS-2 (Modified Timber Emph)	NA /4	NA				
MS-3 (Big Game Emphasis)	1078608	686544	-54.6	-62.5	-31.4	-36.0
MS-5 (Phillips Lake)	2971	1743	-0.3	-0.4	0	0
MS-6 (Undeveloped Disp Rec)	148077	58554	-21.5	-34.4	-11.4	-18.3
MS-9 (NRA Disp Rec/Native Veg)	157739	44542	-11.8	-28.0	0	0
MS-10 (NRA Forage Production)	130133	45614	-12.1	-28.6	0	0
MS-11 (NRA Disp Rec/Timber)	75653	57727	-5.5	-16.6	0	0
MS-12 (Indian Cr Res Nat Area)	965	870	0	0	0	0
MS-14 (Starkey Experimental For)	27123	15506	0	0	0	0
MS-15 (Old Growth)	40312	40312	-4.5	-6.3	-0.8	-1.3
MS-16 (Admin Sites, Rec Sites) 5/	3742	2010	-0.7	-1.2	0	0
MS-18 (Anadromous Fish Habitat)	6/	6/				
Riparian	18409	18409	0	0	0	0
Visual Foreground	55705	55705	-10.1	-11.9	+0.3	+0.3
Visual Middle Ground	72087	72087	-3.5	-4.8	+0.1	+0.3

1/ Tradeoffs are in excess of those generated by the MMR's which are already a part of Benchmark Run #7. These tradeoffs are discussed as part of the analysis prior to alternative formulation.

2/ Total acres of a given management emphasis includes acres not suitable or not cost effective for timber management. Tradeoffs calculated on suitable timbered acres. Acres relate to FORPLAN reports. Acres differ from those shown in alternatives because of the need to represent certain prescriptions as management emphases in FORPLAN that are part of other management strategies in alternatives. (Riparian and visual management emphases are prescriptions within MS-1, MS-2 and MS-3.)

3/ Economic data are from FORPLAN and are therefore exclusive of nontimber considerations.

4/ NA - Management emphasis is not applicable in this alternative.

5/ Includes "a lake" and "recsite" management emphasis in FORPLAN.

6/ Not differentiated from MS-3.

Table B-44
TIMBER TRADEOFFS FOR ALTERNATIVE CONSTRAINTS 1/
--ALTERNATIVE G--

Management Strategy/Constraint	Total Acres 2/	Suitable Acres	Alt G vs Run #7		Alt G vs Alt B	
			MMCF	MM$ 3/	MMCF	MM$ 3/
MS-1 (MMR Hrvst Dispersion)	849810	569886	0	0	0	0
MS-2 (Modified Timber Emph)	347133	165325	-6.7	-11.4	+0.3	+0.5
MS-3 (Big Game Emphasis)	NA /4	NA				
MS-5 (Phillips Lake)	2971	1743	-0.3	-0.4	0	0
MS-6 (Undeveloped Disp Rec)	60750	0	0	0	0	0
MS-9 (NRA Disp Rec/Native Veg)	157739	44542	-11.8	-28.0	0	0
MS-10 (NRA Forage Production)	130133	45614	-12.1	-28.6	0	0
MS-11 (NRA Disp Rec/Timber)	75653	57727	-5.5	-16.6	0	0
MS-12 (Indian Cr Res Nat Area)	965	870	0	0	0	0
MS-14 (Starkey Experimental For)	27123	15506	0	0	0	0
MS-15 (Old Growth)	28184	28184	0	0	0	0
MS-16 (Admin Sites, Rec Sites) 5/	3742	2010	-0.7	-1.2	0	0
MS-18 (Anadromous Fish Habitat)	NA	NA				
Riparian	19573	19573	0	0	0	0
Visual Foreground	23044	23044	-3.6	-4.2	0	0
Visual Middle Ground	12747	12747	0	0	0	0

1/ Tradeoffs are in excess of those generated by the MMR's which are already a part of Benchmark Run #7. These tradeoffs are discussed as part of the analysis prior to alternative formulation.
2/ Total acres of a given management emphasis includes acres not suitable or not cost effective for timber management. Tradeoffs calculated on suitable timbered acres. Acres relate to FORPLAN reports. Acres differ from those shown in alternatives because of the need to represent certain prescriptions as management emphases in FORPLAN that are part of other management strategies in alternatives. (Riparian and visual management emphases are prescriptions within MS-1, MS-2 and MS-3.)
3/ Economic data are from FORPLAN and are therefore exclusive of nontimber considerations.
4/ NA - Management emphasis is not applicable in this alternative.
5/ Includes "a lake" and "recsite" management emphasis in FORPLAN.

Table B-45
TIMBER TRADEOFFS FOR ALTERNATIVE CONSTRAINTS 1/
--ALTERNATIVE H--

Management Strategy/Constraint	Total Acres 2/	Suitable Acres	Alt H vs Run #7 MMCF	Alt H vs Run #7 MM$ 3/	Alt H vs Alt C MMCF	Alt H vs Alt C MM$ 3/
MS-1 (MMR Hrvst Dispersion)	618569	434939	0	0	0	0
MS-2 (Modified Timber Emph)	NA /4	NA				
MS-3 (Big Game Emphasis)	499318	266356	-21.2	-24.2	+2.0	+2.3
MS-5 (Phillips Lake)	2971	1743	-0.3	-0.4	0	0
MS-6 (Undeveloped Disp Rec)	108780	27514	-10.1	-16.1	0	0
MS-9 (NRA Disp Rec/Native Veg)	157739	44542	-11.8	-28.0	0	0
MS-10 (NRA Forage Production)	130133	45614	-12.1	-28.6	0	0
MS-11 (NRA Disp Rec/Timber)	75653	57727	-5.5	-16.6		0
MS-12 (Indian Cr Res Nat Area)	965	870	0	0	0	0
MS-14 (Starkey Experimental For)	27123	15506	0	0	0	0
MS-15 (Old Growth)	38196	38196	-3.7	-5.0	0	0
MS-16 (Admin Sites, Rec Sites) 5/	3742	2010	-0.7	-1.2	0	0
MS-18 (Anadromous Fish Habitat)	6/	6/				
Riparian	19029	19029	0	0	0	0
Visual Foreground	57214	57214	-10.4	-12.2	0	0
Visual Middle Ground	72035	72035	-3.5	-4.8	+0.1	+0.3

1/ Tradeoffs are in excess of those generated by the MMR's which are already a part of Benchmark Run #7. These tradeoffs are discussed as part of the analysis prior to alternative formulation.
2/ Total acres of a given management emphasis includes acres not suitable or not cost effective for timber management. Tradeoffs calculated on suitable timbered acres. Acres relate to FORPLAN reports. Acres differ from those shown in alternatives because of the need to represent certain prescriptions as management emphases in FORPLAN that are part of other management strategies in alternatives. (Riparian and visual management emphases are prescriptions within MS-1, MS-2 and MS-3.)
3/ Economic data are from FORPLAN and are therefore exclusive of nontimber considerations.
4/ NA - Management emphasis is not applicable in this alternative.
5/ Includes "a lake" and "recsite" management emphasis in FORPLAN.
6/ Not differentiated from MS-3.

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Appendix C

UNDEVELOPED AREAS

Background

During the first Roadless Area Review and Evaluation (RARE, FEIS October 1973) 14 roadless areas were identified on the Wallowa-Whitman National Forest. One, the Lower Minam, was selected for wilderness study. (Public Law 92-521, 1972, had directed that the Lower Minam be studied for wilderness and RARE was recognizing this direction)

Five areas were studied for wilderness through the Wallowa Valley Unit Planning effort (FEIS November 1975). All were recommended for nonwilderness uses and were eliminated from the RARE inventory.

With the change in the Federal administration in 1976 roadless area inventory criteria received less rigid interpretation and RARE II was initiated. This resulted in many new areas on the Forest being identified and several being combined.

Five areas were studied during the Grande Ronde Unit Planning Process (FEIS 4/78). All were allocated to nonwilderness uses and eliminated from the RARE II inventory.

The final RARE II inventory showed 43 areas, all of which are wholly or partially within the Wallowa-Whitman administrative area. This included two on the Nezperce National Forest within the Hells Canyon National Recreation Area (HCNRA).

RARE II (FEIS 1/79) placed 15 areas, all within the HCNRA, to be resolved through the HCNRA planning process. The HCNRA decision (FEIS 4/82) recommended two areas for wilderness in their entirety, part of another for wilderness, one for further planning, and the remainder for nonwilderness uses. The further planning area (Homestead) lies partially on land administered by the USDI, Bureau of Land Management (BLM) and that agency is taking the lead in conducting the study which is not yet completed.

The Oregon Wilderness Bill of 1984 designated the same three HCNRA areas (Westside Reservoir Face, McGraw Creek, and part of Lick Creek) for wilderness. It also designated the Park and Lower Minam areas for wilderness in their entirety, thus eliminating them from the inventory. Many other areas from other parts of the Forest were partially included in the Wilderness Act.

Three areas have recently been eliminated from the roadless area inventory because of timber harvesting and associated development. These are the Upper Grande Ronde, Beaver Creek, Owsley, and a small remnant of the North Fork John Day Roadless Area that was not placed in wilderness by the Oregon

Wilderness Bill of 1984. In 1984 the small Dunns Bluff area (1,013 acres) was identified and added to the roadless area inventory. Since it was inventoried after RARE II and was not considered by Congress in the deliberations leading to the Oregon Wilderness Bill of 1984, it is eligible for wilderness recommendation through the current Forest planning process.

There are now 36 roadless areas on the Forest and this appendix deals with these areas. Six, however, are shared with the Umatilla National Forest which in each case has the largest portion. Although included in the data in this appendix, the Forest Land and Resource Management Plan EIS for the Umatilla National Forest will provide more detail on each of these six areas.

Roadless area review within the Hells Canyon NRA was completed during development of the Hells Canyon National Recreation Area Comprehensive Management Plan and Environmental Impact Statement, 4/30/82. McGraw Creek and West Side Reservoir Face were entirely allocated to wilderness.

The bottom of Table C-3 shows the numbers and acres of roadless areas that will remain in an undeveloped condition by alternative within the HCNRA. For a more detailed description and wilderness evaluations, see the Hells Canyon FEIS, Appendix D.

This appendix includes:

1. Table C-1 showing the roadless area status with changes that have occurred and the reason for change.
2. Table C-2 showing roadless areas that no longer meet minimum requirements for wilderness consideration.
3. Table C-3 which shows the numbers, acres, and percentage of numbers and acres of roadless areas that are in an undeveloped condition by alternative.
4. Table C-4 which shows the timber volume and suitable forest land by roadless area.
5. Table C-5 which shows the acres by recreation opportunity spectrum classes for the current situation.
6. Descriptions of roadless areas including discussions of capability, availability, and need for wilderness. Also included are one-half inch per mile maps of each area.
7. A brief discussion of environmental consequences of each roadless area.
8. Table C-6 which shows the roadless area designation by management strategy by alternative.
9. Table C-7 which shows the approximate annual timber harvest by alternative by roadless areas.
10. Table C-8 which shows the recreation opportunity spectrum by alternative by roadless areas.

11. Table C-9 which shows the road miles by alternative by roadless areas for decades one through three.

The reader is also referred to Chapters III and IV for additional information on roadless areas.

Table C-1
ROADLESS AREA STATUS (FEDERAL LANDS)

Roadless Areas Outside HCNRA

NAME	RARE #	ORIGINAL ACRES	CURRENT ACRES	REASON FOR CHANGE
Boulder Park	282	13,040	12,311	Wilderness addition
Castle Ridge	278	9,065	12,001	More accurate mapping
Deadhorse	G08	10,520	10,451	More accurate mapping
Dunns Bluff	WW1	1,013	1,013	New roadless area
Grande Ronde 1/	267	5,100	4,890	More accurate mapping
Greenhorn 2/	252	160	161	More accurate mapping
Hellhole 1/	261	200	513	More accurate mapping
Huckleberry	289	21,800	10,707	Wilderness addition
Hurricane Creek	288	6,200	1,623	Wilderness addition
Joseph Canyon	G04	28,060	23,602	Timber harvest
Little Creek	280	2,080	2,907	More accurate mapping
Little Eagle Meadows	283	8,080	7,140	Wilderness addition
Little Sheep	286	6,360	5,278	Wilderness addition
Lower Minam	279	32,884	0	Wilderness addition
Marble Point	271	7,170	7,135	More accurate mapping
Monument Rock 3/	240	12,300	5,958	New wilderness
Mount Emily	277	10,560	12,022	More accurate mapping, Timber harvest
North Mount Emily 1/	262	660	772	More accurate mapping
Park	287	640	0	Wilderness addition
Reservoir	284	11,360	13,595	More accurate mapping
Squaw 1/	601	5400	3,320	Timber harvest
Tope Creek	G03	7,000	8,674	More accurate mapping
Tower 1/	256	100	85	More accurate mapping
Twin Mountain	273	72,820	60,903	New wilderness
Upper Catherine Creek	281	15,260	6,844	Wilderness addition, timber harvest

Roadless Areas Within HCNRA

NAME	RARE #	ORIGINAL ACRES	CURRENT ACRES	REASON FOR CHANGE
Big Canyon (ID)	853	16,500	14,236	More accurate mapping
Buckhorn	297	16,318	16,022	More accurate mapping
Cook Ridge	299	19,900	19,422	More accurate mapping
Klopton Creek-Corral Creek (ID)	854	23,520	20,325	More accurate mapping
Homestead 4/	291	6,260	5,733	More accurate mapping
Imnaha Face	294	28,710	28,716	More accurate mapping
Lake Fork	290	20,555	14,898	More accurate mapping HCNRA land allocation
Lick Creek	285	5,880	2,143	Wilderness addition
Lord Flat Somers Point	295	74,700	68,295	More accurate mapping
McGraw Creek	292	5,900	0	Wilderness addition
Mountain Sheep	298	14,700	16,777	More accurate mapping
Sheep Divide	602	15,700	16,178	More accurate mapping
Snake River	296	33,595	29,933	More accurate mapping
Westside Reservoir Face	293	14,100	0	Wilderness addition
Wildhorse	300	20,800	19,868	More accurate mapping

1/ Portions also lie within Umatilla National Forest
2/ Portions also lie within Malheur and Umatilla National Forests
3/ Portions also lie within Malheur National Forest
4/ Portions also lie within lands administered by USDI Bureau of Land Management.

Table C-2
ROADLESS AREAS NO LONGER MEETING MINIMUM REQUIREMENTS FOR WILDERNESS CONSIDERATION

NAME	RARE #	REASON FOR CHANGE
Beaver Creek	276	Timber sales
North Fork John Day 1/	253	Timber sales, wilderness addition
Owsley 1/	259	Less than 5,000 acres
Upper Grande Ronde	275	Timber sales, advanced roading

1/ Portions also lie within Umatilla National Forest

Table C-3
NONDEVELOPMENT MANAGEMENT AREAS
(Acres by Alternative)

ROADLESS AREA NAME	RARE#	A	B&Bd	C&Cd	D	E	F	G	H
Boulder Park	282	10460	1906	5836	5836	12311	12311	1106	5836
Castle Ridge	278	6806	867	4108	4108	12001	867	867	4108
Deadhorse	G08					10451			
Dunns Bluff	WW1	1013		966	966	1013	1013		966
Grande Ronde	267	4890		4890	4890	4890	4890		4890
Greenhorn	252	161				161			
Hellhole	261					513			
Homestead	291	5733	5733	5733	5733	5733	5733	5733	5733
Huckleberry	289	2186		1951	1951	10707			1951
Hurricane Creek	288	1623		1504	1504	1623	1623		1504
Joseph Canyon	G04					23602	2159		
Lake Fork	290	2815	2765	2765	2765	17663	17663	17663	2765
Little Creek	280					2907	2907		
Little Eagle Meadows	283	6277	1561	2792	2792	7140	7140	1561	2792
Little Sheep	286	2124		4738	4738	5278	5278		4738
Marble Point	271		2150	2297	2297	7135	2141	2150	2297
Monument Rock	240			2097		5958	2125		2097
Mount Emily	277	8143				12022	10041		
North Mount Emily	262					772			
Reservoir	284	12616	6462	11743	11743	13595	13595	6462	11743
Squaw	601					3220			
Tope Creek	G03					8674			
Tower	256					85			
Twin Mountain	273	45048	39259	48007	46625	60903	48014	39259	48007
Upper Catherine Creek	281	121		2071	2071	6844	6844		2071
NUMBERS W/O NRA	25	15	8	15	14	25	17	8	15
ACRES W/O NRA		110016	60703	101498	98019	235201	144344	75601	101498
% NUMBERS W/O NRA		60	32	60	56	100	68	32	60
% ACRES W/O NRA		47	26	43	42	100	61	32	43
Big Canyon (Idaho)	853	14236	14236	14236	14236	14236	14236	14236	14236
Buckhorn	297	15466	15466	15466	15466	15466	15466	15466	15466
Cook Ridge	299	16149	16149	16149	16149	16149	16149	16149	16149
Corral Creek (Idaho)	854	19180	19180	19180	19180	19180	19180	19180	19180
Imnaha Face	294	25812	25812	25812	25812	25812	25812	25812	25812
Lick Creek	285	218	218	218	218	218	218	218	218
Lord Flat Somers Point	295	63912	63912	63912	63912	63912	63912	63912	63912
Mountain Sheep	298	16777	16777	16777	16777	16777	16777	16777	16777
Sheep Divide	602	16178	16178	16178	16178	16178	16178	16178	16178
Snake River	296	29933	29933	29933	29933	29933	29933	29933	29933
Wildhorse	300	14602	14602	14602	14602	14602	14602	14602	14302
NUMBERS NRA	11	11	11	11	11	11	11	11	11
ACRES NRA		232463	232463	232463	232463	232463	232463	232463	232463
NUMBERS WITH NRA	36	26	19	26	25	36	28	19	26
ACRES WITH NRA		342479	293166	333961	330482	467664	376807	308064	333961
% NUMBERS WITH NRA		72	53	72	69	100	78	53	72
% ACRES WITH NRA		73	63	71	71	100	81	66	71

Table C-4
TIMBER VOLUME & ACRES

Date 08/21/85 Roadless Area Name	Rare#	Net Acres	Tent 2/ Suited Acres	Unsuit Acres	Suit 3/ Land Acres	Annual Timber MMBF	Standing Volume MMBF
Boulder Park	282	12,311	7,443	2,888	4,555	.726	58.115
Castle Ridge	278	12,001	10,537	249	10,288	1.199	95.947
Deadhorse	G08	10,451	1,623	241	1,382	.143	11.467
Dunns Bluff	WW1	1,013	850	18	832	.070	5.568
Grande Ronde 1/	267	4,890	2,080	78	2,002	.240	19.190
Greenhorn 1/	252	161	146	0	146	.023	1.868
Hellhole 1/	261	513	361	0	361	.071	5.681
Homestead	291	5,733	1,197	161	1,036	.101	8.042
Huckleberry	289	10,707	8,570	741	7,829	.847	67.751
Hurricane Creek	288	1,623	1,450	51	1,399	.142	11.381
Joseph Canyon	G04	23,602	7,911	803	7,108	.775	61.981
Lake Fork	290	14,898	11,127	275	10,852	1.799	143.904
Little Creek	280	2,907	2,728	106	2,622	.232	18.575
Little Eagle Meadows	283	7,140	4,649	1,124	3,525	.531	42.475
Little Sheep	286	5,278	4,456	94	4,362	.520	41.565
Marble Point	271	7,135	4,984	54	4,930	.736	58.899
Monument Rock	240	5,958	3,315	532	2,783	.317	25.365
Mount Emily	277	12,022	8,812	693	8,119	1.319	105.530
North Mount Emily 1/	262	772	516	66	450	.086	6.841
Reservoir	284	13,595	5,756	911	4,845	.807	64.530
Squaw 1/	601	3,220	3,097	0	3,097	.310	24.832
Tope Creek	G03	8,674	2,091	271	1,820	.166	13.258
Tower 1/	256	85	85	0	85	.008	.622
Twin Mountain	273	60,903	32,391	9,616	22,775	3.359	268.704
Upper Catherine Creek	281	6,844	6,126	599	5,527	.644	51.544
TOTAL		232,436	132,301	19,571	112,730	15.171	1213.635
1/ Shared with Umatilla NF		9,641	6,285	144	6,141	.738	59.034

2/ Tentatively suited forest land
3/ Suitable forest land

Table C-5
RECREATION OPPORTUNITY SPECTRUM*
Current Situation (acres)

Date 06/17/85

Roadless Area Name	Rare#	Rural	Road M	SPM	SPNM	Prim	Totals
Boulder Park	282	0	3,422	5,699	3,190	0	12,311
Castle Ridge	278	0	1,182	10,819	0	0	12,001
Deadhorse	G08	0	244	4,090	6,117	0	10,451
Dunns Bluff	WW1	0	0	1,013	0	0	1,013
Grande Ronde	267	0	0	0	4,890	0	4,890
Greenhorn	252	0	161	0	0	0	161
Hellhole	261	0	513	0	0	0	513
Homestead	291	0	3,503	0	2,230	0	5,733
Huckleberry	289	0	2,455	1,690	6,562	0	10,707
Hurricane Creek	288	0	0	376	1,247	0	1,623
Joseph Canyon	G04	0	1,606	12,597	9,399	0	23,602
Lake Fork	290	0	1,830	13,068	0	0	14,898
Little Creek	280	0	1,115	160	1,632	0	2,907
Little Eagle Meadows	283	0	1,450	3,530	2,160	0	7,140
Little Sheep	286	62	578	0	4,638	0	5,278
Marble Point	271	0	1,136	5,999	0	0	7,135
Monument Rock	240	0	1,537	2,003	2,418	0	5,958
Mount Emily	277	0	1,625	10,397	0	0	12,022
North Mount Emily	262	0	772	0	0	0	772
Reservoir	284	0	167	13,428	0	0	13,595
Squaw	601	0	3,220	0	0	0	3,220
Tope Creek	G03	0	549	0	8,125	0	8,674
Tower	256	0	85	0	0	0	85
Twin Mountain	273	0	9,157	30,845	20,901	0	60,903
Upper Catherine Creek	281	0	2,013	3,681	1,150	0	6,844
TOTAL		62	38,320	119,395	74,659	0	232,436

* Road M: Roaded Modified
SPM: Semiprimitive Motorized
SPNM: Semiprimitive Nonmotorized
PRIM: Primitive
(See glossary for definitions of terms)

Boulder Park (6282) and Little Eagle Meadows (6283) Roadless Areas 12,311 Acres and 7,140 Acres

Description. The Boulder Park and Little Eagle Meadows areas border the Eagle Cap Wilderness on the south and southwest. They lie about ten miles northwest of the town of Halfway, Oregon. Due to the 1984 additions to Eagle Cap Wilderness, the remaining roadless areas consist of three segments in Boulder Park of approximately 9,600 acres, 700 acres, 2,000 acres, as well as 7,100 acres in Little Eagle Meadows (see maps).

The largest (9,600-acre) portion contains Bennet Peak, Two Color Lake and the headwater areas tributary to Eagle Creek. The area ranges from 4,400 feet elevation near the east fork of Eagle Creek to over 7,000 feet at Bennet Peak and is accessed from Forest Roads 7745 and 7755. A number of wheel track roads and roads to mines are along the boundaries of these areas. The 2,000-acre segment is located near West Eagle Meadow at the headwaters of West Eagle Creek and includes portions of Fake Creek, at an elevation of about 5,600 feet. The smallest segment, about 700 acres, is next to Two Color Campground and near Cougar Meadow.

These segments of the original Boulder Park Roadless Area are at lower elevation and are more heavily timbered than the 729 acres added to the Eagle Cap Wilderness. They were not included in the original RARE study, but were a part of RARE II study. Little Eagle Meadows was also not in the original RARE study, but was included in RARE II.

The 7,100 acres in the Little Eagle Meadows area are mixed conifer forest land, grassland, and some rock outcrops. Portions of Kettle Creek, Twin Canyon Creek, Sullivan Creek are in this vicinity. Elevations range from 4,400 feet near the east fork of Eagle Creek to 7,500 feet near the headwaters of Sullivan Creek.

Soils are predominantly of granitic origin. No fish-bearing streams exist within these roadless areas, but water quality in the streams significantly affects the overall quality of main Eagle Creek, a heavy producer of rainbow trout. No threatened and endangered plants or animals are known in these areas. Several range allotments cover these roadless areas, providing late summer forage for domestic livestock. All portions under discussion are outside the winter big-game range.

Recreation use is estimated at around 3,000 visitor days per year, mostly in association with fall big-game hunting. Other use includes snowmobiling, hiking, backpacking. The area is adjacent to Two Color Campground and Boulder Park Resort in the central portions, and established mining areas on the south and east.

Approximately 3,400 acres of Boulder Park are within the roaded natural component of the recreation opportunity spectrum (ROS) while 5,700 acres are considered semiprimitive motorized and 3,200 are in the semiprimitive nonmotorized component. Within Little Eagle Meadows, approximately 1,400 acres is roaded natural, while 3,500 acres are considered semiprimitive motorized and 2,200 acres are considered semiprimitive nonmotorized.

Capability. The boundaries of these parcels of the roadless areas are varied: some on elevation lines, some on topographic features. Some portions are close to roads and a campground; some isolated --- providing feelings of solitude to the user. They are generally surrounded by National Forest System lands, with the exception of patented mining claims, private land and a resort along Eagle Creek and the east fork of Eagle Creek.

Recreational opportunities include hiking, horseback riding, backpacking, big-game hunting, snowmobiling, cross-country skiing. Some opportunities exist for mountain climbing. Open meadow areas, interspersed with forested land, offer opportunities for scenic vistas.

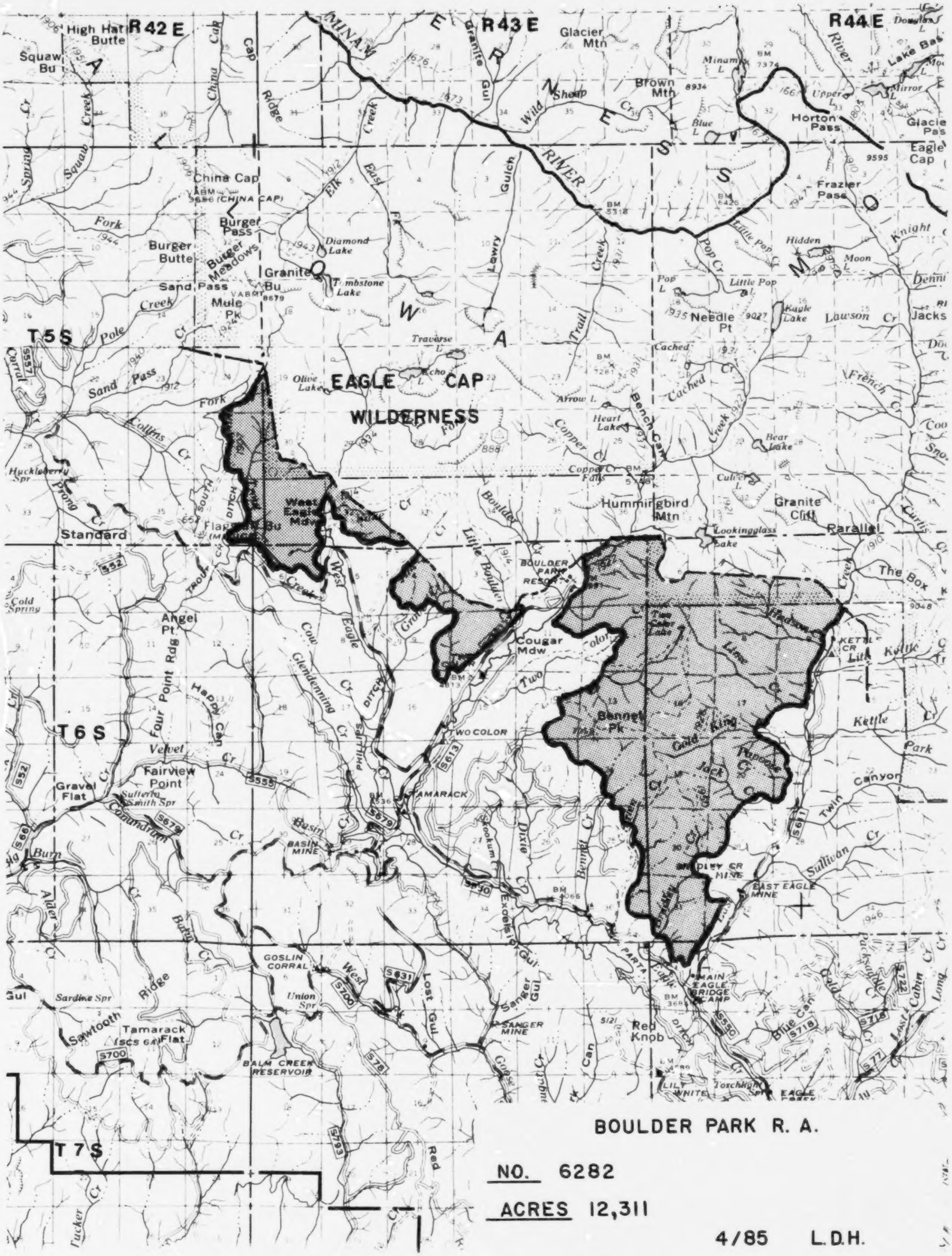
Availability. About 3,200 acres of the larger segment of Boulder Park roadless area have been included in the boundaries of the Gold King timber sale, planned for FY 1989. Contract for the West Eagle Timber Sale, part of which extends into 40 acres of the smallest segment of the Boulder Park area on the west, was awarded in 1984. The northern boundaries of the Gold Eagle and Little Eagle Basin Timber Sales abut the Little Eagle Meadows area on the south. About 3,500 acres of the southwest portion of Little Eagle Meadows roadless area are included in the Sullivan Timber Sale, planned for FY 1989.

With the exception of the above mentioned timber sales, most of these lands have been managed under the Burnt Powder Unit Land Management Plan for preservation and enhancement of dispersed recreation opportunities.

The areas are mineralized, adjacent to a number of patented placer mines along Eagle Creek and include a number of unpatented lode claims in the interior Gold King area. Structures associated with mining claims are scattered through the larger portion of Boulder Park and throughout the Little Eagle Meadows. The Cornucopia Mining District, the largest gold-producing area in Oregon, lies about six miles east of the eastern boundary of Boulder Park and is immediately adjacent to the eastern boundary of Little Eagle Meadows.

Boulder Park contains 4,555 acres of productive forest land, containing 58 MMBF of standing timber. It has the potential to contribute .7 MMBF to the annual timber harvest. Little Eagle Meadows contains 3,525 acres of productive forest land, containing 42 MMBF of standing timber and could contribute .5 MMBF to the annual timber harvest.

Need. These roadless areas are remnants of larger areas that were added to the Eagle Cap Wilderness through the Oregon Wilderness Act of 1984. The portions added to the wilderness were relatively conflict-free. The remaining areas, as previously noted, contain timber and mineral values. The ecosystems represented in the remaining roadless portions are found in abundance in the existing adjoining wilderness. There appears to be no reason to consider retaining the areas for later wilderness consideration unless the purpose is only to add wilderness acres.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T6 S
T7 S
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WALLOWA
MINAM RIVER
High Hat Butte
Squaw Bu
Glacier Mtn
Brown Mtn
Horton Pass
Eagle Cap
Frazier Pass
China Cap
Burger Pass
Burger Butte
Burger Meadows
Granite Bu
Sand Pass
Mule Pk
Diamond Lake
Tombstone Lake
Needle Pt
Olive Lake
Traverse L
Echo L
Arrow L
Heart Lake
Bear Lake
Granite Cliff
Hummingbird Mtn
Lookingglass Lake
Copper Cr Falls
West Eagle Mdw
Standard
BOULDER PARK RESORT
Cougar Mdw
Angel Pt
Bennet Pk
The Box
Fairview Point
Gravel Flat
TAMARACK
BASIN MINE
TWO COLOR
EAST EAGLE MINE
MAIN EAGLE BRIDGE CAMP
Red Knob
GOSLIN CORRAL
Union Spr
Sawtooth Ridge
Tamarack Flat
BALM CREEK RESERVOIR
SANGER MINE
LILY WHITE

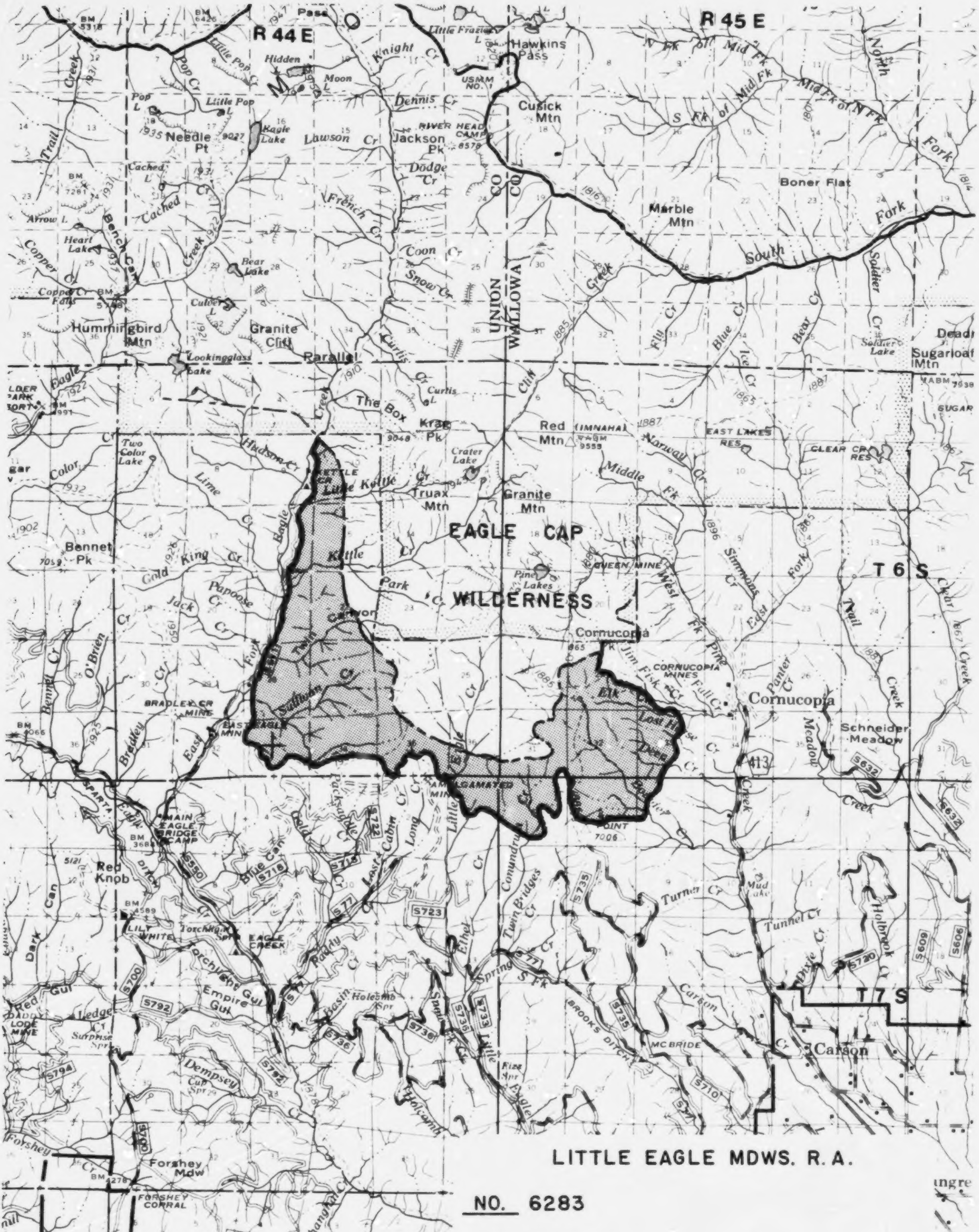
BOULDER PARK R. A.

NO. 6282

ACRES 12,311

4/85 L.D.H.

189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R 45 E
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T 7 S
EAGLE CAP
WILDERNESS
UNION
WALLOWA
CO
CO
Hawkins Pass
Cusick Mtn
Needle Pt
Eagle Lake
Jackson Pk
Marble Mtn
Boner Flat
Hummingbird Mtn
Granite Cliff
Lookingglass Lake
The Box
Krag Pk
Red Mtn
Truax Mtn
Granite Mtn
Bennet Pk
Two Color Lake
Crater Lake
Pine Lakes
Cornucopia
Cornucopia Mines
Schneider Meadow
Sugarloaf Mtn
East Lakes Res
Clear Cr Res
Red Knob
Main Eagle Bridge Camp
Lily White
Empire Gul
Forshey Mdw
Forshey Corral
Carson
Sparta Butte
Six Dollar

LITTLE EAGLE MDWS. R.A.

NO. 6283

ACRES 7,140

4/85 L.D.H.

Castle Ridge Roadless Area (G278)
12,001 Acres

Description. This area was inventoried during the second Roadless Area Review and Evaluation (RARE II) but was eliminated from the inventory through the decision to implement the Grande Ronde Planning Unit Final Environmental Impact Statement. The area was allocated to nonwilderness uses in the unit plan.

Lying some four miles northeast of the town of Cove, this area contains the upper reaches of the Indian Creek, Camp Creek, and Warm Creek drainages. Topography is gentle and rolling. Elevations range from 5,100 feet to over 7,000 feet. The area slopes gradually to the north. The northern third of the area (lower elevation) is considered a good timber growing site and contains stands of Douglas-fir, white fir, lodgepole pine, Engelmann spruce, and western larch. The southern two-thirds is high in elevation and is dominated by dense stands of lodgepole pine, much of which is stunted and of poor or noncommercial quality. Soils originated from basalt.

The southeast corner of the area contains the only Research Natural Area (RNA) on the Forest. It contains 974 acres of the roadless area. The RNA has been established to preserve a mountain hemlock and associated species plant community.

The area is natural in appearance but topography and dense, continuous lodgepole stands are somewhat monotonous, and make cross-country travel difficult.

Scattered throughout the area are large rock outcrops referred to as monadnocks which rise above the surrounding timber stands. These formations provide a degree of variety in an area that otherwise is relatively lacking in scenic or geologic attractions.

Current recreation use is nearly all related to big-game hunting during the fall, bringing the total annual use to approximately 2,000 recreation visitor days. Approximately 90 percent of the area is in the semiprimitive motorized component of the recreation opportunity spectrum while the remainder is considered roaded natural. The roaded natural results from the influence of the roads along the perimeter of the area.

Capability. Because of its compact shape and easily defined boundaries, management of the area as wilderness would not be particularly difficult. Forest roads provide ready access from the Grande Ronde Valley. The area is separated from the Eagle Cap Wilderness on the east by an unobtrusive road and the Dunns Bluff Roadless Area, a one-fourth mile wide undeveloped strip. (See Dunns Bluff description in this section).

The area is natural appearing throughout. The evidence of foot and horse use on trails are the only noticeable imprints of human activities. There are ample opportunities for solitude and unconfined recreation activities, and the dense, extensive tree canopy would provide a certain navigation challenge.

No threatened and endangered species of plants or animal species are known to be in the roadless area, nor are there known opportunities for historical or archaeological study. The Indian Creek RNA provides opportunities for scientific study; this would be available regardless of wilderness classification.

Availability. The area has low potential for recreational use as evidenced by the low level of interest in the area at present. The area has a high potential for limited forms of recreation use but the lack of variety indicates use would remain low. Wildlife provide the primary recreation attraction, especially deer and elk which are found throughout the area during spring, summer, and fall seasons. Fish are limited to small native trout species and are utilized very little.

There are no power withdrawals, proposed impoundments, or other encumbrances, water-related or otherwise.

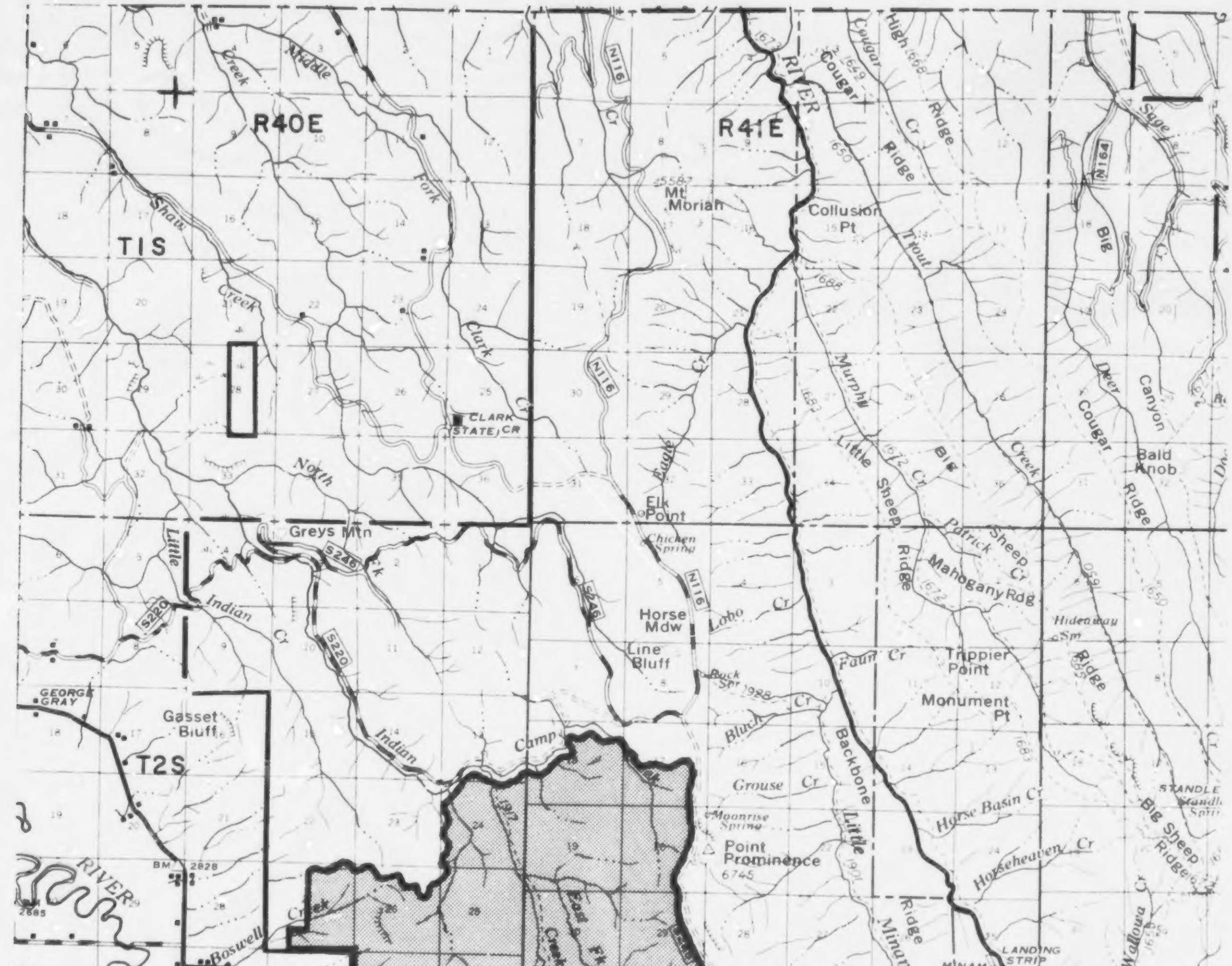
The area is within a cattle grazing allotment but dense timber and lack of forage preclude significant livestock use. It is not believed to be mineralized and there are no gas or oil leases.

The area has 10,288 acres of productive forest land, contains some 96 MMBF of timber and has an annual harvest potential of 1.2 MMBF.

There is no private land within the area; the Forest boundary forms the western edge of the roadless area and abuts private land. This would appear to present no particular problem in the event of wilderness classification.

Need. The Eagle Cap Wilderness lies virtually across the road from the Castle Ridge Roadless Area. Within the Eagle Cap Wilderness the features and attractions found in the Castle Ridge area are more notable and more abundant.

Interest in the area has been low with those favoring wilderness being the same who suggested that all roadless areas be designated wilderness. The area was not included in either Senate or House of Representatives 1984 wilderness proposals.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T2S
T3S
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Clark Cr
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North
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High Ridge
Trout Cr
Murphy
Little Sheep Ridge
Big Sheep Cr
Patrick
Mahogany Rdg
Deer Canyon
Cougar Ridge
Bald Knob
Big
Elk Point
Chicken Spring
Greys Mtn
Little Indian Cr
Indian Cr
Horse Mdw
Line Bluff
Labo Cr
Buck Spr
Bluch Cr
Fawn Cr
Trippier Point
Monument Pt
Hideaway Spr
Ridge
GEORGE GRAY
Gasset Bluff
Camp
Grouse Cr
Moonrise Spring
Point Prominence
6745
Backbone
Little
Horse Basin Cr
Horseheaven Cr
STANDLEY
Big Sheep Ridge
Wallowa
RIVER
Boswell Creek
East Fk
Creek
Bald
Castle Cr
Castle Ridge
Pine Butte
Canyon
Minam Ridge
MINAM LODGE
RED'S HORSE RANCH
LANDING STRIP
Little Minam Mdw
Chapar
Eckesley
Cr
Dunns Bluff
Big Long Ridge
Yew Spr
Warm
SHANGHAI SCHOOL
Creek
INDIAN CR CAMP
TRANSMISSION TOWER
Mt Fanny
7155
Mt Fanny Spring
Huckleberry Cr
River
Young
Boulder
Jim White
Murphy
Duncan
Cove
(COVE)
(PHYS PT)
(COVE CH SPIRE)
3002
2882
Mills Creek
Phys Pt
Deer Cr
Bridge
Lucky Spr
Horseshoe
Threemile Creek
Horseshoe Basin
Grizzly Cr
Whiskey Flat
Ridge
Creek
Mill
VIEWPOINT
Summit Spr
S23
N116
S220
S245
Creek
Birch
Spring Creek
(LADD)
3666
High Valley

CASTLE RIDGE R. A.

NO. 6278

ACRES 12,001

4/85 L.D.H.

A3

Deadhorse Roadless Area (G08)
10,451 Acres

Description. This area was inventoried during the Roadless Area Review and Evaluation (RARE). It was allocated to nonwilderness uses through the Wallowa Valley Planning Unit Environmental Impact Statement (land management plan) of November 3, 1975. The potential wilderness character remains unchanged since that time. It lies some 20 miles east of Enterprise in the Imnaha River drainage. The vicinity of the area can be reached by traveling a two-lane paved road from Joseph. Jeep trails then provide access to several points in the roadless area.

The area is dominated by steep, nontimbered, grass-covered ridges interspersed with basalt rimrocks. Elevations range from 2,500 feet on the northeast boundary near Big Sheep Creek to 5,500 feet on Deadhorse Ridge. The area is approximately evenly split between the semiprimitive motorized and semiprimitive nonmotorized recreation opportunity spectrum. Recreation use is limited to big-game hunting and bird hunting but use is low, estimated to be no more than 200 recreation visitor days per year. Other than hunting attractions, the area offers interesting views of the deep canyon country of which it is a part and has some hiking and horseback riding potential. The entire area is considered to be elk and deer winter range.

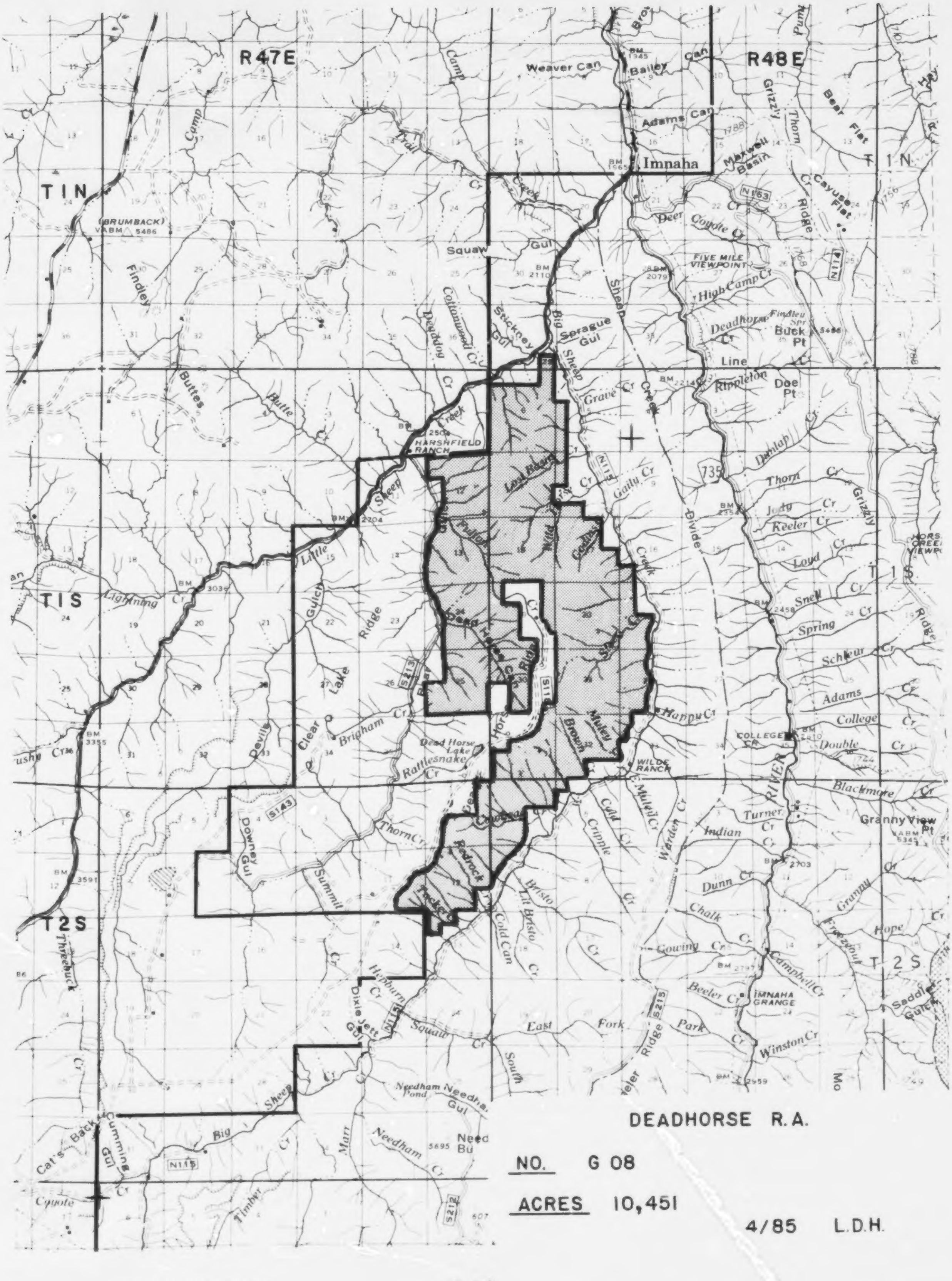
Capability. The area is bounded on three sides by private land containing roads and scattered structures that are visible from the interior of the roadless area. Because of its narrow, irregular configuration, and many miles of boundary, manageability of the area as wilderness could be difficult. There is virtually no way the boundary of the area could be adjusted to effectively shield a sizeable area from the sites and sounds of human activity. Because of its shape, a visitor can perceive the extent of the entire area from ridgetop views. Since one only has to go downhill in any direction to find a road, the sense of solitude and spirit of adventure and self reliance are low.

The interior of the area remains natural appearing except for fences, livestock water facilities, and livestock trails. There are no special features or notable opportunities for scientific, historical, or archaeological study, nor are there threatened or endangered species of plants or animals.

Availability. Recreation opportunities, and probable use, would remain essentially unchanged by wilderness classification. The current recreation opportunity spectrum classes would be unchanged. The area provides 3,000 animal unit months of livestock grazing annually. There is no evidence of mineralization. Private lands are immediately adjacent to much of the boundary and scattered parcels lie within the area.

The area contains 1,382 acres of productive timbered land with 11 MMBF of standing timber and has the potential to contribute .1 MMBF to the annual timber harvest for the forest.

__Need__. The Eagle Cap Wilderness lies 15 miles to the southwest of the area and the Hells Canyon Wilderness is 7 miles to the east. These two large wilderness areas provide the ecosystems that are found in the Deadhorse Roadless Area and in much greater amount. The area was scrutinized by the public during RARE and during unit planning (Wallowa Valley Planning Unit). Interest in the area for wilderness has been virtually nonexistent; the only expressions favoring wilderness coming from those who suggested that all roadless areas be placed in wilderness.


R47E
R48E
T1N
T1S
T2S
Imnaha
Weaver Can
Bailey Can
Adams Can
Maxwell Basin
Grizzly
Thorn
Bear Flat
Cayuse Flat
Deer
Coyote Cr
FIVE MILE VIEWPOINT
High Camp Cr
Deadhorse
Findley Spr
Buck Pt
Line
Rippleton
Doe Pt
(BRUMBACK) VABM 5486
Findley
Buttes
Butte
Camp
Trail
Squaw Gul
Cottonwood Cr
Deadog
Stickney Gul
Big Sheep
Sprague Gul
Grave Cr
Sheep Creek
HARSHFIELD RANCH
Little Sheep
Lost Rock
Gaily Cr
Dunlap
Thorn Cr
Jody Cr
Keeler Cr
Loud Cr
Grizzly
HORSE CREEK VIEWPOINT
Lightning Cr
Gulch
Lake Ridge
Clear Lake
Brigham Cr
Devils
Dead Horse Lake
Rattlesnake Cr
Dead Horse Cr
Ridge
Brown
Muley
Happy Cr
WILDE RANCH
Snell Cr
Spring
Schleur Cr
Adams Cr
College Cr
Double Cr
COLLEGE CR
RIVER
Divide
Blackmore
Granny View Pt
VABM 5345
Turner Cr
Indian Cr
Dunn Cr
Chalk Cr
Gowing Cr
Campbell Cr
Beeler Cr
IMNAHA GRANGE
Winston Cr
Park Cr
Hope
Granny Cr
Freezeout
Saddle Gulch
E. Mutel Cr
Cold Cr
Cripple Cr
Warden Cr
Redrock
Bristo
Lit Bristo
Cold Can
Downey Gul
Summit
Hepburn
Dixie Jett Gul
Squaw Cr
East Fork
South
Ridge
Needham Pond
Needham Gul
Need Bu
Needham Cr
Marr
Timber
Big Sheep
Cumming Gul
Cat's Back
Coyote
Threebuck
Brushy Cr
BM 3355
BM 3591
BM 3036
BM 2704
BM 2504
BM 2110
BM 2079
BM 2214
BM 2352
BM 2458
BM 2703
BM 2959
BM 1665
BM 1945
5695
1788
735
N163
N114
N115
S213
S111
S143
S215
S212

DEADHORSE R.A.

NO. G 08

ACRES 10,451

4/85 L.D.H.

Dunns Bluff Roadless Area (WW1)
1,013 Acres

Description. Located seven miles northeast of the community of Cove, this roadless area is a sliver of undeveloped land lying between the western edge of the established Eagle Cap Wilderness and a National Forest System road which parallels the boundary. The area is three-quarters of a mile wide at its widest point and averages approximately one-quarter mile in width.

This area was not inventoried until March 1984 during development of the Forest Land and Resource Management Plan. To the present time, it has been managed no differently than if it were a part of the wilderness, and only by careful examination of the wilderness boundary description does one discover that this nonwilderness sliver exists. Most of the area is relatively flat, sloping gently to the west. Elevations range from 6,400 to 7,000 feet elevation. Soils are derived from basalt bedrock and volcanic ash. The area is heavily timbered with lodgepole pine, subalpine fir, and spruce, much of which is of noncommercial size.

The area is natural appearing, but there are no special recreation attractions such as lakes, streams, or geologic features. Current recreation use is almost exclusively by deer and elk hunters during fall hunting season. Mt. Emily Spring, within the area, is a popular spot for hunting camps. Because of the gentle terrain, vehicles can be driven cross-country to many locations within the area.

All of the area is within the semiprimitive motorized component of the recreation opportunity spectrum (ROS).

Capability. There are no private lands within or along the perimeter of the area. Because it lies adjacent to existing wilderness, the size of the area is irrelevant. If it were added to the wilderness, a satisfactory boundary, which would parallel the road along the western edge of the area, could be established. The new boundary would be more difficult to manage since the relatively flat ground would allow vehicles to drive into the wilderness at many points.

Opportunities for solitude, primitive recreation, and challenging recreation experience are the same as those of the Eagle Cap Wilderness of which the area is an integral part.

There are no known threatened or endangered species of plants or animals within the area. There are no known opportunities for historic or scientific study, nor are there known significant cultural resources.

Availability. With wilderness classification, the current types or amount of wilderness use would be unlikely to change. Fall hunting would continue to be the primary use. Current off-road vehicle use would of course be curtailed.

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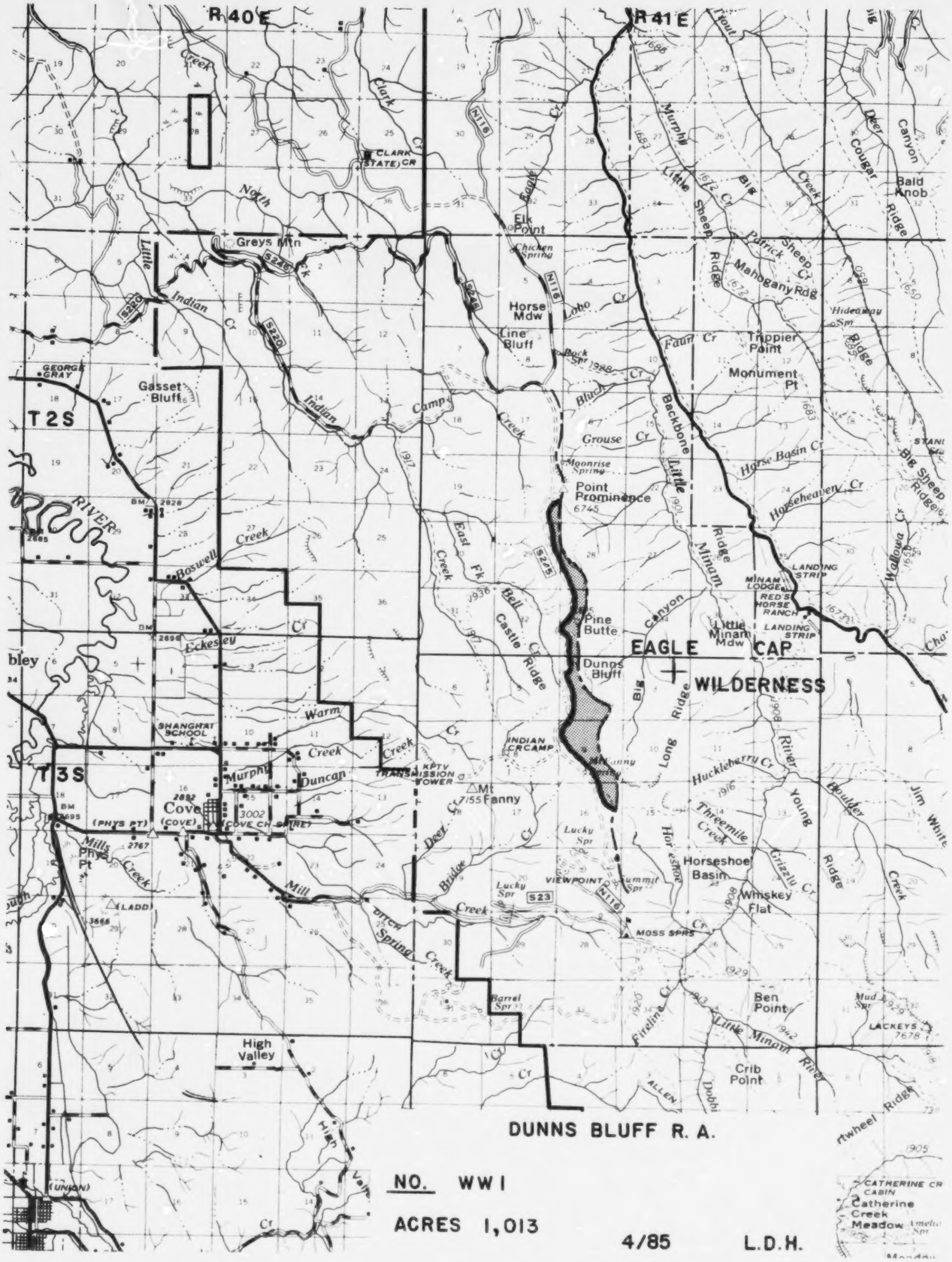
The area is not used for livestock grazing. There are no known mineral deposits or gas or oil leases, nor are there any permits for special land uses.

The area contains 832 acres of productive forest land with a standing volume of approximately 6 MMBF. It has the potential to contribute .07 MMBF to the annual timber harvest for the Forest. Much of the lodgepole pine was recently killed by mountain pine beetles. There are no timber sales planned for the foreseeable future. Some wood cutting for domestic use occurs along the road which forms the western edge of the roadless area.

Need. There are no ecosystems or features of interest found in the area that are not found more abundantly within the Eagle Cap Wilderness. It does, however, represent a piece of land with relatively low resource values that could be added to the wilderness if expansion were deemed desirable. At present, the roadless area serves to buffer sights and sounds of human activities from the interior of the present wilderness.

There has been no public interest in the area to date. This could be attributable to its not having been inventoried. However, during several efforts within the past ten years to have public help in identifying roadless areas, it was never recognized, although other areas along the perimeter of the Eagle Cap Wilderness were pointed out.


R 40 E
R 41 E
T 2 S
T 3 S
Greys Mtn
Elk Point
Chicken Spring
Horse Mdw
Line Bluff
Gasset Bluff
Point Prominence
6745
Pine Butte
Dunns Bluff
Mt Fanny
EAGLE CAP WILDERNESS
Cove
Horseshoe Basin
Whiskey Flat
Ben Point
Crib Point
High Valley
Minam Lodge
Red's Horse Ranch
Landing Strip
Little Minam Mdw
Trippier Point
Monument Pt
Bald Knob
Lackeys
Catherine Creek Meadow
Moss Sprs
Viewpoint
Summit Spr
Lucky Spr
Shanghai School
KPTV Transmission Tower
Indian Cr Camp
Union
River

DUNNS BLUFF R. A.

NO. WW1

ACRES 1,013

4/85 L.D.H.

Grande Ronde Roadless Area (6267)
4,890 Acres (Wallowa-Whitman Portion)

Description. At this location the Grande Ronde River dissects the roadless area and also forms the boundary between the Umatilla and Wallowa-Whitman National Forests. Approximately 75 percent of the area lies on the Umatilla National Forest and that Forest Plan should be consulted for an evaluation of the area as a whole.

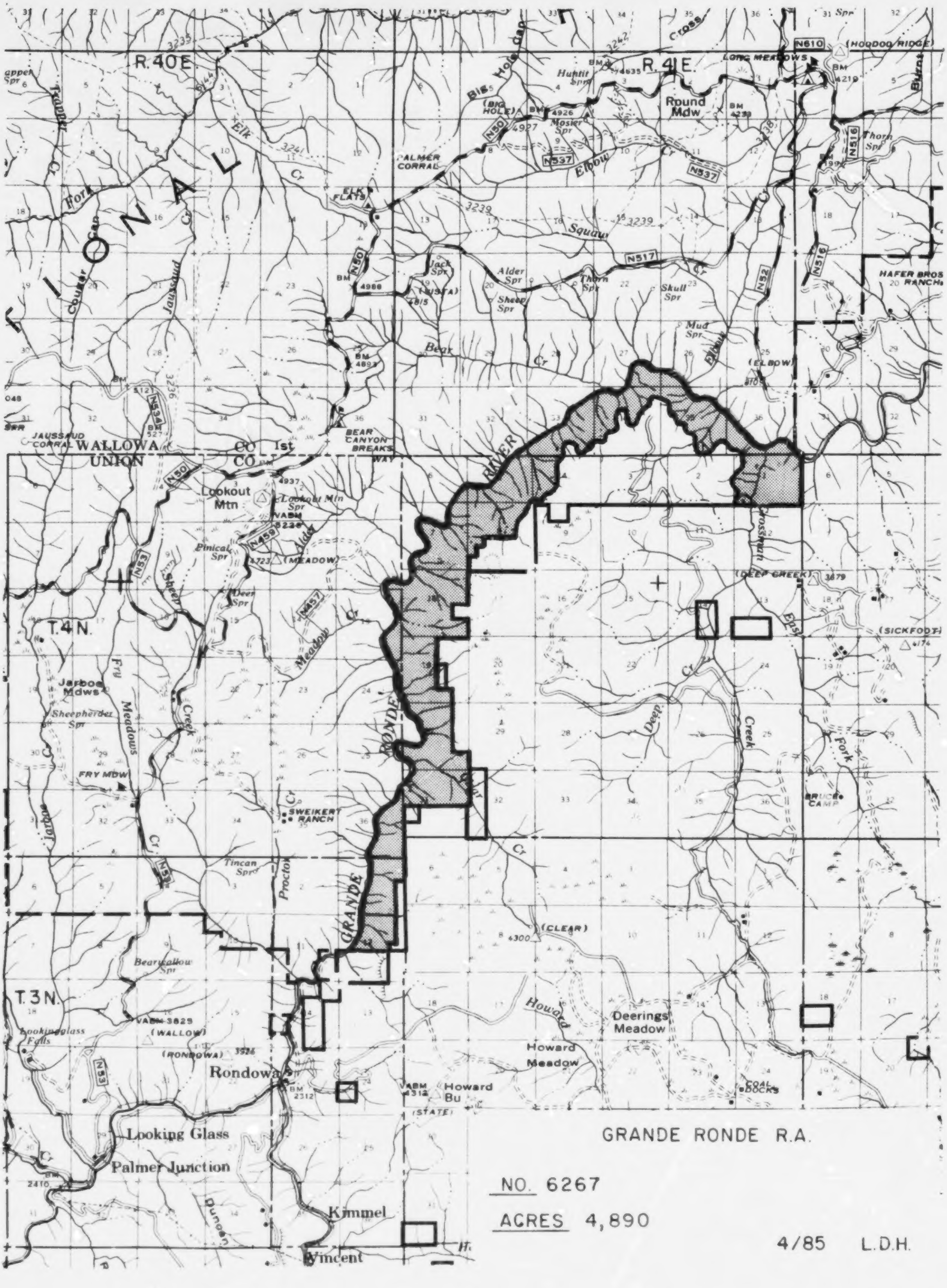
The Wallowa-Whitman portion of the area consists of the immediate east and north-facing slopes of the Grande Ronde River, ranging in width from less than one-fourth mile to one mile, and extending some 12 air miles. Topography is rugged with many steep draws leading toward the river below. North slopes are timbered with ponderosa pine and Douglas-fir while south slopes are open grassland, forming the alternating pattern common to much of the canyon country in northeast Oregon. Elevations range from 2,000 feet at river level where the river leaves the National Forest to over 4,000 feet along the canyon rim.

Soils are of basalt origin and there are no recognized mineral values. The area contains about 2,000 acres of productive forest land and has approximately 19 MMBF standing volume. The area could potentially contribute .2 MMBF to the allowable harvest for the Forest.

The Wallowa-Whitman portion of this area lies within the semiprimitive nonmotorized component of the recreation opportunity spectrum (ROS).

Approximately 500 acres are withdrawn under power site classification No. 191. Additional potential waterpower and water storage developments are located in T.4N., R.40E., Section 13 and T.5N., R.41E., Section 25 at mile 72 and Elbow Creek respectively.

For details on capability, availability and need, see the Environmental Impact Statement for the Forest Land and Resource Management Plan of the Umatilla National Forest.


R.40E.
R.41E.
T.4N.
T.3N.
NATIONAL
LONG MEADOWS
(HOODOO RIDGE)
Round Mdw
Hunt Spr
Mosier Spr
(BIG HOLE)
Big Hole Gap
PALMER CORRAL
ELK FLATS
Elk Cr
Elbow Cr
Squaw Cr
Bear Cr
Jack Spr
(VISTA)
Alder Spr
Sheep Spr
Thorn Spr
Skull Spr
Mud Spr
(ELBOW)
Thorn Spr
HAFER BROS RANCH
Cougar Cr
Jaussaud Cr
JAUSSAUD CORRAL
WALLOWA
UNION
CO
CO
1st
BEAR CANYON BREAKS WAY
Lookout Mtn
Lookout Mtn Spr
Pinical Spr
(MEADOW)
Deer Spr
Meadow Cr
Sheep Cr
Jarboe Mdws
Sheepherder Spr
Fry Meadows Creek
FRY MDW
Jarboe Cr
Tincan Spr
Proctor Cr
SWEIKERT RANCH
GRANDE RONDE RIVER
(DEEP CREEK)
Crossman Cr
Deep Cr
Creek
(SICKFOOT)
Fork
BRUCE CAMP
(CLEAR)
Howard Cr
Deerings Meadow
Howard Meadow
COAL DOCKS
Howard Bu
(STATE)
Bearwallow Spr
(WALLOW)
(RONDOWA)
Lookingglass Falls
Rondowa
Looking Glass
Palmer Junction
Kimmel
Vincent
Dunoon
N50
N53
N537
N517
N52
N516
N610
N459
N457

GRANDE RONDE R.A.

NO. 6267

ACRES 4,890

4/85 L.D.H.

Huckleberry Roadless Area (6289)
10,707 Acres

Description. This is the portion of the Huckleberry Roadless Area that remains after more than half of the area was placed in the Eagle Cap Wilderness by the Oregon Wilderness Bill of 1984. The remaining area is, for the most part, heavily timbered and includes major portions of the Bear Creek, Little Bear Creek, Big Creek and Deer Creek drainages. Elevations range from 5,000 to over 7,000 feet at Huckleberry Mountain and Fox Point. The area lies on the north flanks of the Wallowa Mountains, some 8 miles south of the town of Wallowa. It was included in RARE II and was considered by Congress in adjusting the Eagle Cap Wilderness boundary in 1972 and again in 1984. During each adjustment acres were added to the Eagle Cap Wilderness.

The area is characterized by ridges and canyons but is much less rugged than the lower Minam area to the west and the existing wilderness to the south. Recreation use is dominated by elk and deer hunting, but the area also provides berrypicking, hiking and horseback riding.

Approximately 2,500 acres of the area is within the roaded natural component of the recreation opportunity spectrum (ROS), while 1,700 acres are considered semiprimitive motorized and 6,600 acres are in the semiprimitive nonmotorized component.

Capability. There are opportunities for solitude, primitive and challenging recreation activities although not of the caliber that exists in the present wilderness. There are no known threatened or endangered species nor are there opportunities for historic or scientific study. There are no known cultural resources of special significance.

Availability. Eventual wilderness classification would not be likely to alter the present recreational use of the area.

Portions of the area are grazed by domestic sheep and it provides approximately 700 sheep animal unit months of grazing each year. There are no known mineral deposits, gas or oil leases, nor are there any permits for special land uses. The area contains 7,800 acres of productive forest land with a standing volume of 68 MMBF. The area has the potential to contribute .8 MMBF to the annual allowable harvest for the Forest.

Need. There are no ecosystems or features of interest found in the area that are not found more abundantly within the Eagle Cap Wilderness. The wilderness additions of 1972 and 1984 have reduced the area to less than 30 percent of its original size. There appears to be no reason to retain the character of the area for future wilderness consideration unless the sole purpose is to expand the size of the existing Eagle Cap Wilderness.

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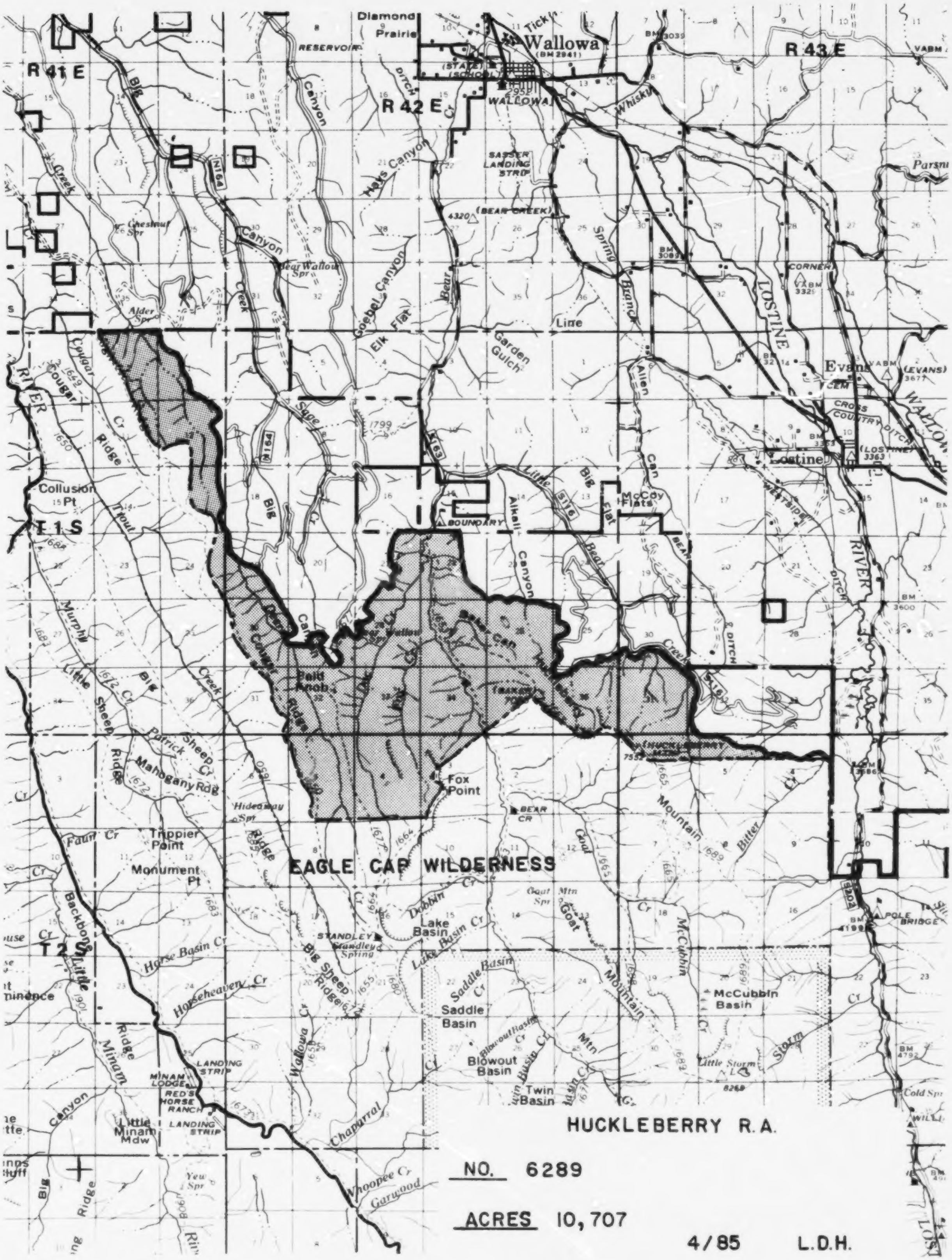
Wallowa
Diamond Prairie
R 41 E
R 42 E
R 43 E
Lostine
Evans
LOSTINE RIVER
T 1 S
T 2 S
Collusion Pt
Fox Point
Bear Cr
McCoy Flats
Sasser Landing Strip
Bear Creek
Lake Basin
Saddle Basin
Blowout Basin
Twin Basin
McCubbin Basin
Standley Spring
Trippier Point
Monument Pt
Minam Lodge
Red's Horse Ranch
Little Minam Mdw
Pole Bridge
EAGLE CAP WILDERNESS

HUCKLEBERRY R.A.

NO. 6289

ACRES 10,707

4/85 L.D.H.

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Hurricane Creek Roadless Area (6288)
1,623 Acres

Description. This former RARE II area now consists of five separate parcels, ranging in size from 40 to 450 acres. They are what remain of the former 6,200-acre roadless area after most of it was added to the Eagle Cap Wilderness by the Oregon Wilderness Bill of 1984. These remnant areas result from the irregular Forest boundary where the attempt was made to establish the new wilderness boundary along less irregular, more easily managed lines.

The areas lie at 6000 feet elevation within the mid to upper reaches of Reavis, Murray, Alder and Scotch Creeks and are perched on the steep, north-facing upper Forest slopes overlooking the Wallowa Valley southwest of Enterprise. Subalpine fir is the dominant timber species. All but approximately 200 acres are timbered.

Because the area forms part of the scenic backdrop for the town of Enterprise, primary use of the area is viewing (being viewed). However, primary on-site use is big-game hunting which is limited by the difficult access and dense vegetation.

Approximately 400 acres of the area are within the semiprimitive motorized component of the recreation opportunity (ROS) while the remaining 1,200 acres are within the semiprimitive nonmotorized component.

Capability. Sites and sounds from the valley below would be apparent from any of the five pieces of land. There would be little sense of solitude and low sense of self-reliance because of the proximity to fields and roads below. If the areas were added to the wilderness, they would create an irregular boundary which would tend to mix wilderness lands with off-Forest lands which contain uses that would not conform to wilderness standards.

The areas are natural appearing with no man-made features. There are no special features or notable opportunities for scientific, archaeological, or historical study, nor are there known threatened or endangered species of plants or animals.

Availability. Recreation opportunity and use would be unchanged by wilderness classification.

The areas are not grazed by domestic livestock, and the potential to do so is low.

The area contains 1,399 acres of productive forest land with 11.3 MMBF of standing timber. It has the potential to contribute .1 MMBF to the annual allowable harvest for the Forest.

Need. There are no ecotypes or other features found on these areas that are not found abundantly on the adjoining Eagle Cap Wilderness. There has been no expression of public sentiment for placing these pieces of land in the wilderness system since the bulk of the area was made part of the Eagle Cap Wilderness by the Oregon Wilderness Act of 1984.

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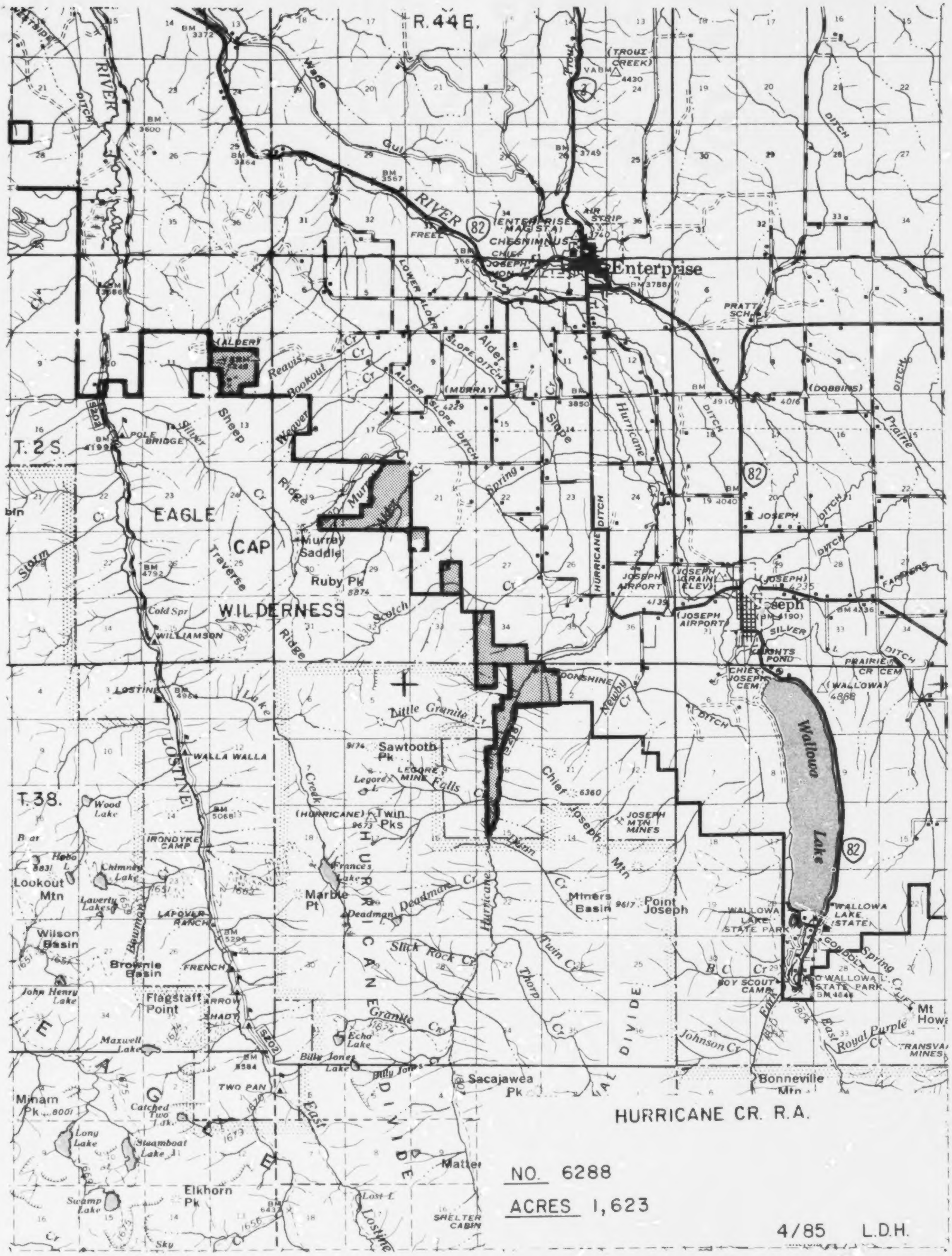
R.44E.
T.2S.
T.3S.
RIVER
Enterprise
Joseph
EAGLE
CAP
WILDERNESS
Murray Saddle
Ruby Pk
Sawtooth Pk
Twin Pks
Marble Pt
Chief Joseph Mtn
Point Joseph
Miners Basin
Wallowa Lake
WALLOWA LAKE STATE PARK
HURRICANE
DIVIDE
LOSTINE
Lookout Mtn
Wilson Basin
Brownie Basin
Flagstaff Point
Elkhorn Pk
Minam Pk
Sacajawea Pk
Bonneville Mtn
Mt Howard
Matterhorn
Echo Lake
Frances Lake
Wood Lake
Chimney Lake
Laverty Lakes
Maxwell Lake
Long Lake
Steamboat Lake
Swamp Lake
John Henry Lake
Hurricane
Scotch
Granite Cr
Slick Rock Cr
Deadman Cr
Twin Cr
Thorp
Johnson Cr
Royal Purple Cr
JOSEPH AIRPORT
SILVER
PRAIRIE
DITCH
82
BOY SCOUT CAMP
TRANSVAAL MINES
JOSEPH MTN MINES

HURRICANE CR. R.A.

NO. 6288

ACRES 1,623

4/85 L.D.H.

Joseph Canyon Roadless Area (G04)
23,602 Acres

Description. This roadless area lies adjacent to State Highway 3 on the northern boundary of the Forest, 20 miles north of Enterprise. It contains the upper reaches of the Joseph Creek drainage, including the tributaries Swamp Creek, Peavine Creek, Rush Creek, and Davis Creek. Joseph Creek continues in a northerly direction and empties into the Grande Ronde River some 15 miles north of the roadless area. The roadless area was inventoried during the first Roadless Area Review and Evaluation and allocated to nonwilderness uses through the Wallowa Valley Planning Unit EIS (Land Management Plan), dated November 3, 1975. In this plan the commitment was made to retain the essentially roadless character of the area.

The area has had timber harvest entries at several points which have reduced the size of the area from its original 28,300 acres to its present size. Two additional sales have been awarded which occupy 11,000 acres of the area. Harvesting on these two sales has not yet been initiated. These sales, as well as those on which logging has occurred, are to have the timber removed by helicopter; therefore, the area remains essentially unroaded and will remain unroaded if and when harvesting is accomplished on the two awarded sales.

The area is noted as an example of the rugged topography in northeast Oregon, characterized by deep canyons with very steep, grass-covered sideslopes interspersed with numerous exposed basalt layers. It is well known, largely because of its proximity to State Highway 3 and a popular roadside viewpoint which overlooks the 2,000-foot depths of Joseph Canyon. Elevations range from 2,600 feet in the northern part of the area to near 5,000 feet on some of the southern ridges.

Soils are of basalt origin. Typical of the region, southern and western slopes are nontimbered with native bunchgrass ecosystems, while many northern and eastern slopes are heavily forested with Douglas-fir and ponderosa pine being the dominant tree species.

Approximately 1,600 acres of the area is within the roaded natural component of the recreation opportunity spectrum (ROS) while 12,600 acres are considered semiprimitive-motorized and 9,400 acres are in the semiprimitive nonmotorized component. Primary recreation activities are big-game hunting and scenic viewing, but some hiking and camping by individuals and organized groups occur. Joseph, Davis, and Peavine Creeks provide trout fishing. Total recreation use amounts to an estimated 4,000 RVD's per year.

All the streams in the area are used by anadromous fish, providing spawning habitat for salmon and steelhead. Plans are currently underway to restore the conditions of several of the streams which have deteriorated because of past timber harvesting and livestock grazing practices.

Capability. The area is bounded on the west, south, and east by National Forest land and on the north by private land and Bureau of Land Management-administered land. Many of the more picturesque portions of the canyon lie on private lands north of the inventoried roadless area and outside the National Forest.

Because of its relatively small size, irregular configuration and many miles of boundary, manageability as wilderness would be difficult. Adjustment of the boundary to shield a sizable portion of the area from the sounds of vehicles on State Highway 3 would not appear to be possible. Because of its shape a visitor can perceive the entire size of the area from several points, including the State Highway viewpoint. The depths of the canyons provide opportunities for solitude; hiking the rugged terrain would contribute to a sense of reliance. This would be diminished, however, by the knowledge that roads would always be within a relatively short distance. Because of the steep sideslopes and deep canyons, the area provides opportunity for physically challenging experiences of hiking into and out of the area.

Although the area remains relatively natural, there are scattered examples of human evidence. These include abandoned fields and remains of buildings within the isolated private land parcels along Joseph Creek. Stumps, old railroad grades, and skid trails in the lower reaches of Davis and Swamp Creeks witness logging activities that occurred in the 1920's and 1930's. Some 50 livestock watering facilities, 30 miles of fence, and 6 miles of jeep road are found within the area.

Availability. Wilderness classification would not result in a change in the recreation opportunity spectrum classes but because the area is readily accessible, the publicity associated with classification would increase use, especially for hiking and viewing. If the area were administratively allocated for nonwilderness uses which emphasize primitive and semiprimitive forms of nonmotorized recreation, use would not be expected to increase appreciably over present levels.

Wildlife species include virtually all species that inhabit northeast Oregon. Sightings of peregrine falcon and bald eagle are reported, but no known threatened and endangered plants are reported within the area. Most of this land is used by elk and deer for winter range. The major streams are used by anadromous and resident fish.

The area provides over 4,000 animal unit months of livestock grazing annually from the five range allotments that lie all or partially within its boundaries.

Although power site withdrawals exist within the roadless area on Joseph Creek, there are no active plans to develop the site. The site was not recommended for further study by the Corp of Engineers in its recently completed national hydroelectric power resources study. There are no other existing or planned impoundments on any of the streams within the area. There are no other energy withdrawals such as pipelines, powerlines, or electronic sites.

907

The area includes an estimated 62 MMBF of standing timber and would contribute .8 MMBF to the annual allowable harvest of the Forest.

There is no evidence of mineralization or oil, gas, or coal deposits within the area.

Nez Perce Indians used the area as evidenced by stone implements and examples of lithic scatter. The primary canyon and creek were named for Joseph, who was Chief at the time of settlement of the Wallowa Valley and surrounding area by non-Indians. There is speculation by some that Chief Joseph was born within what is now the roadless area, but this has not been verified. If the canyon is his birthplace, it is more likely that he was born in one of several caves near the mouth of Joseph Creek, well north of the roadless area in the State of Washington.*

Regardless of Chief Joseph's birth place, the roadless area does have potential archaeological significance. This was recognized by the Senate Committee on Energy and Natural Resources in a May 18, 1984 report which accompanied the Oregon Wilderness Act of 1984 (HR-1149) directing the Forest Service to "...inventory all archaeological and historic sites in the drainage and determine their eligibility for the National Register of Historic Places. Prior to activities that may affect such prehistoric, historic or cultural sites, the Forest Service shall follow the procedures in 36 CFR 800 which implement the Natural Historic Preservation Act, as amended, in order to fully consider and protect the important values of such sites."

At the present time Nez Perce Indians occasionally exercise their treaty rights to hunt and fish in the area, but use is thought to be low since there is an abundance of more accessible land within the vicinity.

There are two small parcels of private land within the area, totalling 401 acres. These parcels lie within the heart of the area, immediately below the Joseph Canyon viewpoint on the State Highway (see map). The lands are not occupied and are used for grazing purposes. They are accessed by jeep trail.

Need. The Wenaha-Tucannon Wilderness lies 15 miles to the north of the roadless area, Hells Canyon Wilderness is 24 miles to the east, and the Eagle Cap Wilderness lies 25 miles to the south. These three large wildernesses contain the same ecosystems, land forms, and features of the Joseph Canyon Roadless Area and in greater amounts.

The area is 300 miles from Portland and 200 miles from Spokane. The Lewiston-Clarkston area is 70 miles to the north.

There has been interest in the roadless area for and against wilderness, since RARE was initiated. It generated a great deal of interest during development of the Wallowa Valley Unit Plan and its not being recommended for wilderness study was a basis for appeal of the plan by local conservation groups. Timber sales within the area have been appealed, but the appeals have not resulted in withdrawing the sales. Efforts to gain the interest of U.S. Congressmen were successful in 1983 when the area was included as a part of HB 1149, a wilderness bill sponsored by Congressmen Weaver, Wyden, and AuCoin. It was not, however, included in the Senate version of the wilderness bill sponsored by Senator Hatfield.

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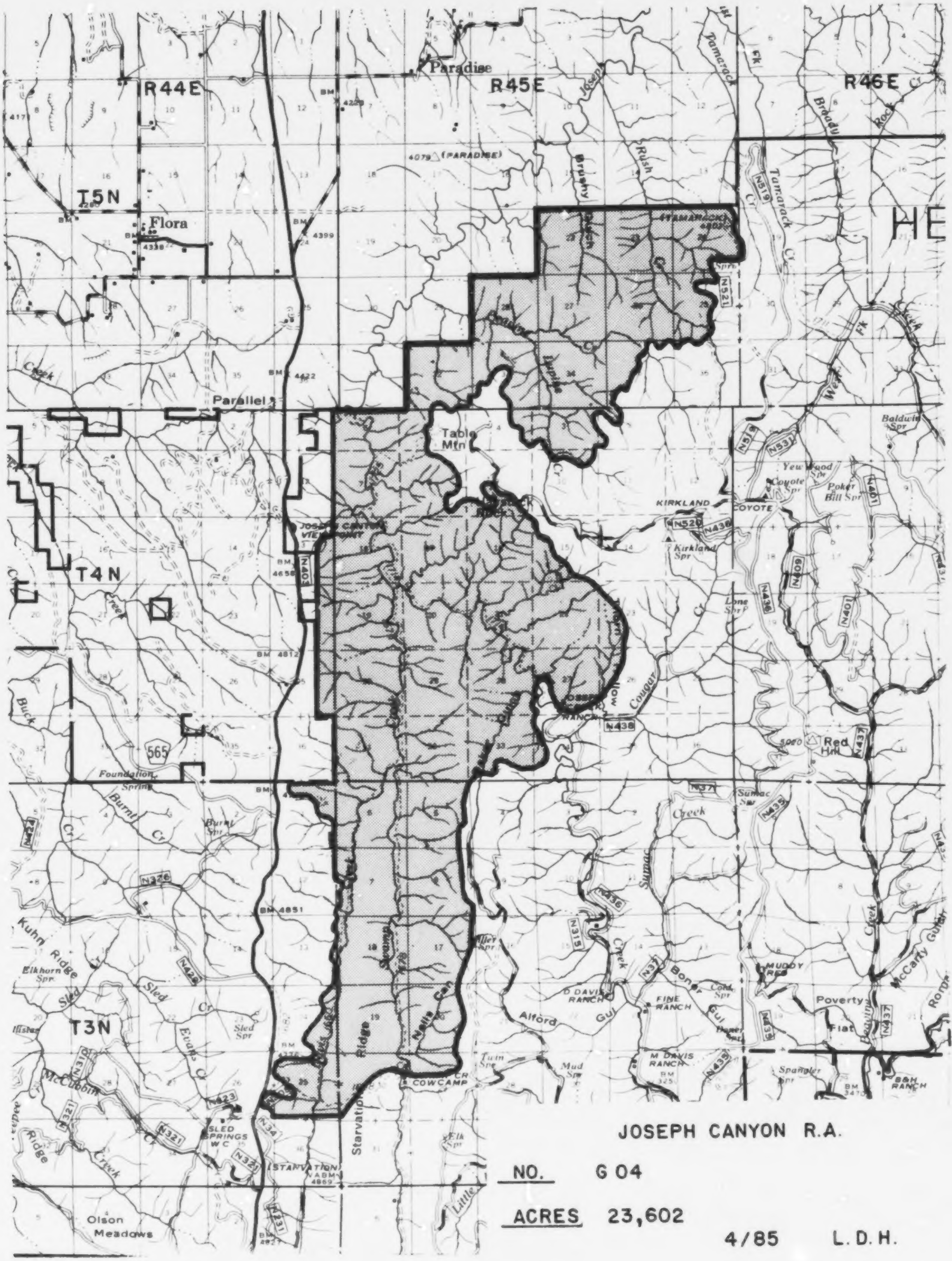
*USDI, Bureau of Land Management, History and Pre-history of the Grande Ronde Unit. Oman, Mary N.D.


R44E
R45E
R46E
T5N
T4N
T3N
Paradise
Flora
Parallel
Table Mtn
JOSEPH CANYON VIEWPOINT
KIRKLAND
COYOTE
Kirkland Spr
Yew Wood Spr
Coyote Spr
Poker Bill Spr
Baldwin Spr
Lone Spr
Red Hill
Sumac Spr
Creek
Tamarack
Broady
Rock Cr
Rush
Brushy
Joseph
Cougar
Foundation Spring
Burnt Cr
Burnt Spr
Buck
Kuhn Ridge
Elkhorn Spr
Sled Cr
Evans Cr
Sled Spr
McCubbin
Ridge
Creek
SLED SPRINGS W C
Olson Meadows
Starvation
Ridge
Swamp
Nells Can
Twin Spr
Mud Spr
COWCAMP
D DAVIS RANCH
FINE RANCH
M DAVIS RANCH
Alford
Gul
Bone Gul
Cold Spr
MUDDY RES
Poverty Flat
Spangler Spr
B&H RANCH
McCarty Gulch
HE
565
N403
N438
N520
N521
N519
N531
N401
N436
N437
N435
N37
N315
N326
N428
N423
N321
N34
N322
N231
BM 4656
BM 4812
BM 4851
BM 4422
BM 4399
BM 4869
4079 (PARADISE)
(TAMARACK)
(STARVATION)

JOSEPH CANYON R.A.

NO. G 04

ACRES 23,602

4/85 L.D.H.

C-32

210

Lake Fork Roadless Area (6290)
14,898 acres

Description. This area lies partially within the Hells Canyon National Recreation Area (HCNRA) acres and partially within the Burnt Powder Planning Unit. The HCNRA decision (FEIS 5/81) allocated 2,765 acres to Management Strategy 10, and 2,681 acres to Management Strategy 11. The remaining 14,898 acres will be analyzed as part of this plan. The northwest boundary lies about half a mile from the 1984 Lick Creek addition to Eagle Cap Wilderness. Hells Canyon Wilderness is about six miles to the northeast. The boundary of Homestead Further Planning Area is a mile to the southeast. Lake Fork contains numerous tributaries to the Pine Creek system, and is immediately to the east of Fish Lake and Fish Lake campground.

This roadless area was inventoried during the original Roadless Area Review and Evaluation (RARE) process, as well as during RARE II, and was allocated to nonwilderness uses through the HCNRA Comprehensive Management Plan (FEIS, 1981).

The area ranges in elevation from around 2,600 feet at the mouth of Little Elk Creek on the southeast, to over 7,000 feet in the northern portion. Topography in the lower third is rough and steep. The middle third is more gentle, with the remainder in gentle slopes of 10 to 30 percent.

The area is typical of land on the southeast of the Wallowa Mountains which slopes to the Snake River, in that it includes varied forest ecosystems, with grass slopes and meadows intermixed. Lower elevation lands consist mainly of Columbia River basalts. Mid-elevation soils have developed from a mixture of basalt and windblown ash. Deeper ash deposits are evident in the north portion.

A mineral survey indicates low potential for placer gold or for lode deposits, although the area is only five miles west of Homestead mining area and about ten miles east of gold-producing areas around Cornucopia. Nearly the entire length of Duck Creek, near the boundary of the Lake Fork area, has placer mining claims.

Existing habitat conditions provide excellent environment for big game. The lower elevations in the southeast portion are suitable big-game winter range. Elk, Lake Fork, and Duck Creeks support resident rainbow and eastern brook trout populations. Since construction of Hells Canyon Dam on the Snake River, no anadromous fish use this area. Water from these tributaries help sustain the high water quality of the Pine Creek watershed in general. Irrigation ditches tapping the upper Lake Fork drainage divert a major part of the normal flow during August and September.

Forest Road 66.3, from Fish Lake and Twin Lakes, separates Lake Fork Roadless Area from Eagle Cap Wilderness. A number of wheel track roads exist throughout the area. Most are closed, and access must be gained by entry permit. An extensive trail system also exists in this area.

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Recreation usage is primarily fall big-game hunting. Hiking, cross country skiing, berry picking, fishing are popular in the Lake Fork area.

Approximately 1,800 acres are within the roaded natural component of the recreation opportunity spectrum. The remaining 13,000 acres are within the semiprimitive motorized component.

Capability. Boundaries of this area are defined by roads, by topographic features and by North Pine Creek on the east. The varied forest canopy/grassland combinations provide good scenic qualities and a sense of solitude. Examples of old-growth ponderosa pine stands are numerous in the Lake Fork area. There is no private land within the boundary.

There are no known threatened or endangered plants or animals inhabiting the area. A few scattered cultural resource finds have been made in the Lake Fork area, primarily lithic fragments. Some old range improvements, such as corrals and sheds, are there. A water transmission ditch under special use permit runs along Lake Fork Creek within the roadless area.

Availability. Productive forest land suitable for timber management occupies 10,852 acres (73 percent) of the roadless area, with 144 MMBF standing timber volume.

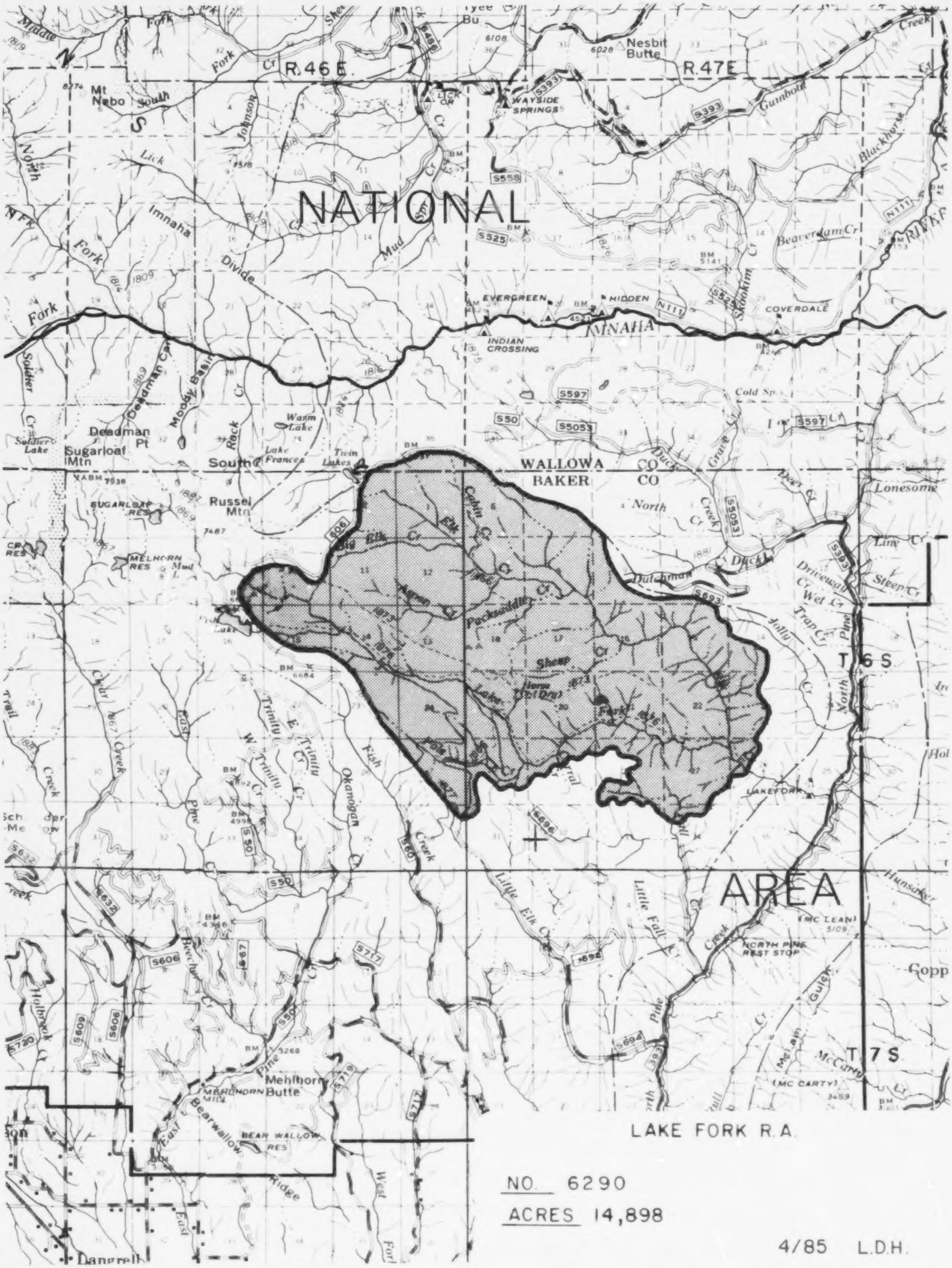
This area could contribute an estimated 1.8 MMBF to the Forest's long-run sustained timber yield. Under the FEIS of the Burnt Powder Unit Management Plan, a portion of Lake Fork is managed with dispersed recreation emphasis. In the portion designated optimum wood/forage production under the Burnt Powder Plan, 7,000 acres are scheduled for timber harvest in the FY 1988 Aspen timber sale. This sale will be located in the upper Elk Creek drainage.

The area is presently undergoing a serious spruce bark beetle epidemic. Plans for salvaging the dying timber may affect the character of the roadless areas.

Need. There are no apparent geologic features, ecosystems, cultural features, or other special attributes that would only be preserved by retaining the undeveloped character of the area through wilderness classification. There has been interest in keeping the area undeveloped for the elk habitat it provides and the hunting experience associated with undeveloped areas.

Lake Fork Roadless Area has been twice considered for addition to the wilderness system (1972 by Congress and 1981 in the Hells Canyon NRA study). Each time it was determined that the needs of society would be best served if the area were managed as non-wilderness. The high timber values contributed to these determinations as did the fact that the features found within the Lake Fork area are well represented in currently established nearby wildernesses.

212


NATIONAL
AREA
R.46E.
R.47E.
T.6S.
T.7S.
Mt Nebo
Nesbit Butte
WAYSIDE SPRINGS
EVERGREEN
HIDDEN
INDIAN CROSSING
COVERDALE
Imnaha
IMNAHA
South Fork
North Fork
Divide
Deadman Pt
Sugarloaf Mtn
Russel Mtn
Warm Lake
Lake Frances
Twin Lakes
WALLOWA CO
BAKER CO
SUGARLOAF RES
MELHORN RES
Fish Lake
Elk Cr
Cabin Cr
Packsaddle Cr
Sheep Cr
Duck Cr
Dutchman
Lonesome
Trinity
Okanogan
Fish Creek
Little Elk Cr
Little Fall Cr
Pine Creek
LAKEFORK
NORTH PINE REST STOP
Mehlhorn Butte
BEAR WALLOW RES
Bearwallow Ridge
Dangrell

LAKE FORK R.A.

NO. 6290

ACRES 14,898

4/85 L.D.H.

Little Creek Roadless Area (6280)
2,907 Acres

Description. The Little Creek Roadless Area lies adjacent to the western edge of the Eagle Cap Wilderness and runs along its boundary for some 3-1/2 miles. The area is 19 miles southeast of La Grande, Oregon and 23 miles southwest of Enterprise, Oregon.

This area was not a part of the RARE II evaluation. It was considered for further wilderness study during the development of the management plan for the Grande Ronde Planning Unit (FEIS published April 1978). As a result of that analysis, the area was allocated to nonwilderness uses.

Elevations range from 5,800 feet at the Forest boundary to 6,800 feet at Bald Mountain on the wilderness boundary. A dominant feature of the roadless area is its extensive uniform lodgepole pine canopy. Scattered, open, grassy ridges and meadows are also found. Recreation opportunity is dominantly semiprimitive nonmotorized (80 percent) with the remaining being roaded natural. Recreation use is estimated to be 400 recreation visitor days per year with half being directly associated with big-game hunting. The area includes sections of Trail 1920, totalling approximately one mile. Soils are dominantly of basalt origin with surface volcanic ash deposits. The western half of the area has been identified as big-game winter range.

The area includes Little Creek and numerous tributaries, none of which contain significant fisheries values. The area currently provides 50 animal unit months of grazing use annually.

Two ditches used for downstream irrigation also lie within the area.

Capability. The boundaries of the roadless area, except on the western edge where it reaches the Forest boundary, are generally on distinct topographic features. This tends to simplify management of the area and separate it effectively from the sights and sounds of adjacent developed lands. The area provides a feeling of solitude to the users.

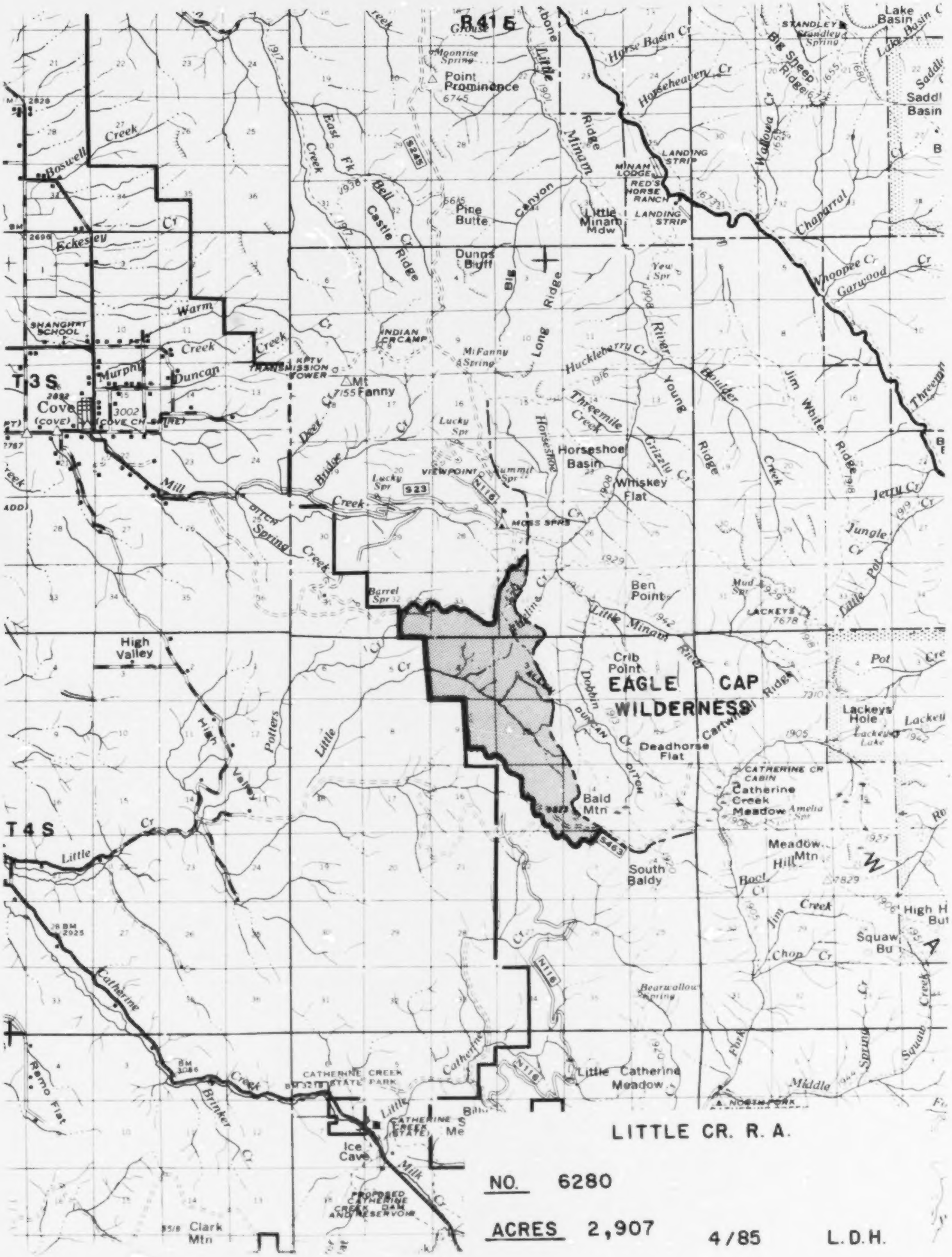
Recreational opportunities are limited to hiking, horseback riding, backpacking, and big-game hunting. The area does not have potential for more challenging activities such as mountain climbing or river rafting. The relatively flat nature of the area and its nearly continuous tree cover do not provide the scenic views typical of areas with more vegetative or topographical variation. No significant change in recreational opportunities would result from designation as wilderness.

There are no threatened or endangered species known to inhabit the area although numerous wildlife species are found. There are no known unusual opportunities for historical or scientific study.

Availability. If the area were managed for wilderness, acreages of the various recreation opportunity spectrum classes would remain essentially unchanged. Development for nonwilderness uses would reduce the acreage of semiprimitive nonmotorized opportunity and increase the acreage of roaded natural opportunity. Use of the area by domestic livestock would not change appreciably regardless of wilderness or nonwilderness classification. Some increase in transitory range would result from timber harvest if the area were developed. The area has no known mineralization of commercial value.

The area includes 2,622 acres of productive forest land dominated by lodgepole pine. The standing volume is 19 MMBF and the area has the potential to contribute .2 MMBF to the annual harvest for the Forest.

Need. Because the Little Creek area is adjacent to the existing wilderness and has manageable boundaries, it could be considered a logical wilderness addition. The types of recreation opportunities provided and the ecosystems found there are also found abundantly within the existing classified wilderness. Public comments during the development of the Grande Ronde Land Management Plan indicated little interest in the addition of this area to the National Wilderness Preservation System.



R41E
T3S
T4S
Point Prominence
Pine Butte
Dunns Bluff
Mt Fanny
Cove
Shanghai School
Boswell Creek
Eckesley Cr
Warm Creek
Murphy Creek
Duncan
Mill Creek
Spring Creek
High Valley
Little Cr
Potters
Catherine Creek
Catherine Creek State Park
Ice Cave
Milk Cr
Proposed Catherine Creek Dam and Reservoir
Clark Mtn
Remo Flat
Brinker Cr
Little Minam River
Little Minam Mdw
Minam Lodge
Red's Horse Ranch
Landing Strip
Horse Basin Cr
Horseheaven Cr
Big Sheep Ridge
Standley Spring
Lake Basin
Saddle Basin
Chaparral
Whoopee Cr
Garwood Cr
Huckleberry Cr
Young River
Boulder Creek
Jim White Ridge
Threemile Creek
Horseshoe Basin
Whiskey Flat
Grizzly Cr
Jerry Cr
Jungle Cr
Little Pot Cr
Moss Sprs
Barrel Spr
Ben Point
Mud Spr
Lackeys 7678
Crib Point
EAGLE CAP WILDERNESS
Cartwheel Ridge
Dobbin Cr
Duncan Ditch
Deadhorse Flat
Catherine Cr Cabin
Catherine Creek Meadow
Amelia Spr
Lackeys Hole
Lackey Lake
Bald Mtn
South Baldy
Meadow Mtn
Hill
Boot Cr
Jim Creek
Chop Cr
High Hat Butte
Squaw Butte
Squaw Creek
Spring Cr
Bearwallow Spring
Little Catherine Meadow
Middle Fork
Indian Cr Camp
McFanny Spring
Lucky Spr
Viewpoint
Summit Spr
KPTV Transmission Tower
Deer Cr
Bridge Creek
Big Canyon
Long Ridge
East Fk
Castle Ridge
Bell Cr
Moonrise Spring
Grouse

LITTLE CR. R.A.

NO. 6280

ACRES 2,907 4/85 L.D.H.

Little Sheep Roadless Area (6286)
5,278 Acres

Description. The area wraps around the northeast corner of the Eagle Cap Wilderness six miles southeast of Joseph, Oregon. It was inventoried as part of RARE II, but was allocated to nonwilderness uses. It was reconsidered in the Oregon Wilderness Bill of 1984 and approximately one-third of the area was added to the Eagle Cap Wilderness. The portions added included most of the high elevation, relatively open, avalanche-scarred, east-facing slopes of Wing Ridge. The remaining roadless area is uniformly steep and is predominantly timbered with elevations ranging from 5,000 to over 8,000 feet near Mt. Howard. The East Fork of the Wallowa River and McCully, Redmont, Little Sheep, and Cabin Creeks all cross the area and contribute water for irrigation in the Wallowa Valley. Nearly all the area is within the semi-primitive nonmotorized component on the recreation opportunity spectrum (ROS) and forms part of the scenic backdrop from the Wallowa Loop Road, a popular recreational drive. Sixty-two acres are classified rural in the ROS system because of its proximity to Wallowa Lake State Park.

Capability. The boundary tends to follow contours with indistinct features, but the boundary, were the area in wilderness, would be no more difficult to manage than the current wilderness boundary.

The only significant evidences of human activity are those found at the inactive Transvaal Mines, where two caved-in adits and a small pit are visible and near Royal Purple Creek on the edge of the roadless area where remains of adits can be found.

Negotiating the rough terrain would offer a challenging hiking experience. The sights and sounds from the Wallowa Loop Road, Mount Howard gondola, and the valley below would tend to detract from a sense of self-reliance and solitude.

The area contains all the wildlife species that are found in the Wallowa Mountains except those associated with lakes and ponds. The area is popular for fall elk and deer hunting, the primary recreational uses.

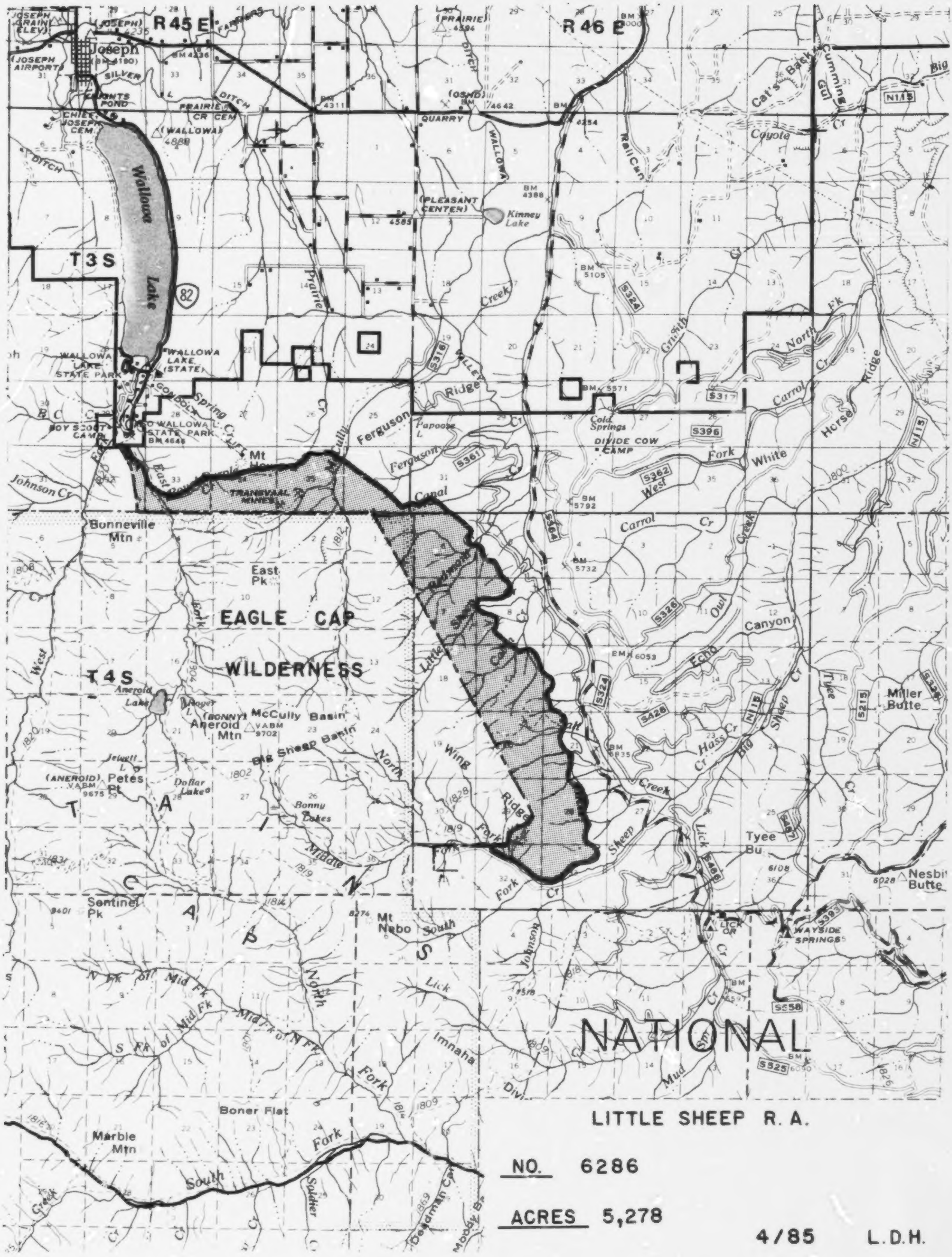
Availability. All the land is in Federal ownership. There are 4,362 acres of productive timberland with approximately 42 MMBF standing volume. The area has potential to contribute .5 MMBF to the annual allowable harvest for the Forest.

Although there is some evidence of silver and molybdenum ore in the Transvaal Mines area, the potential for operable mineral deposits is apparently low. Most of the area is unsuitable for livestock grazing due to topography and dense timber.

There is a waterpower withdrawal of 160 acres under FERC Project No. 3834 within the area.

__Need__. There are no ecosystems within the roadless area that are not found more abundantly in the adjacent Eagle Cap Wilderness. There are no known special opportunities for scientific or historic study, nor are there significant cultural or geologic features.

There is no apparent interest in adding the remainder of the area to wilderness except from those who simply want to add all roadless areas to wilderness. Expanding the size of the Eagle Cap would seem to be the only reason for retaining the undeveloped character of the Little Sheep Roadless Area for later wilderness consideration.


R 45 E
R 46 E
T3S
T4S
Joseph
Wallowa Lake
WALLOWA LAKE STATE PARK
Mt Howard
TRANSVAAL MINES
Bonneville Mtn
East Pk
EAGLE CAP WILDERNESS
Aneroid Lake
Aneroid Mtn
McCully Basin
Big Sheep Basin
Petes Pt
Dollar Lake
Bonny Lakes
Sentinel Pk
Mt Nebo
Kinney Lake
Ferguson Ridge
Cold Springs
DIVIDE COW CAMP
Canyon
Echo
Owl Creek
Miller Butte
Tyee Bu
Nesbit Butte
WAYSIDE SPRINGS
Big Sheep Cr
Little Sheep Creek
Wing Ridge
Marble Mtn
Boner Flat
Imnaha
South Fork
NATIONAL
CAPS

LITTLE SHEEP R. A.

NO. 6286

ACRES 5,278

4/85 L.D.H.

Marble Point Roadless Area (6271)
7,135 Acres

Description. This area lies eight miles east of Baker on the western end of the Elkhorn Range and is separated from the Twin Mountain Roadless Area by the Marble Pass Road and a powerline which parallels the road. It was not inventoried in RARE but was included in RARE II where it was recommended for nonwilderness uses. It was unaffected by the Oregon Wilderness Bill of 1984.

The eastern flank, two-thirds of the area, is entirely within the Baker City Municipal Watershed. This area is mostly timbered. The southwestern slopes are largely nontimbered and form a scenic backdrop above Phillips Lake. The northeast slopes form a backdrop from the Baker Valley. Marble Creek, Elk Creek, and Salmon Creek all originate in the area. All provide downstream irrigation; Salmon and Marble Creeks contribute to the municipal water supply. Elevations range from 5,000 feet to over 7,900 feet.

Soils have formed from granodiorite riparian material and volcanic ash.

Approximately 1,100 acres of the area are within the roaded natural component of the recreation opportunity spectrum (ROS) with the remaining 6,000 acres within the semiprimitive motorized component.

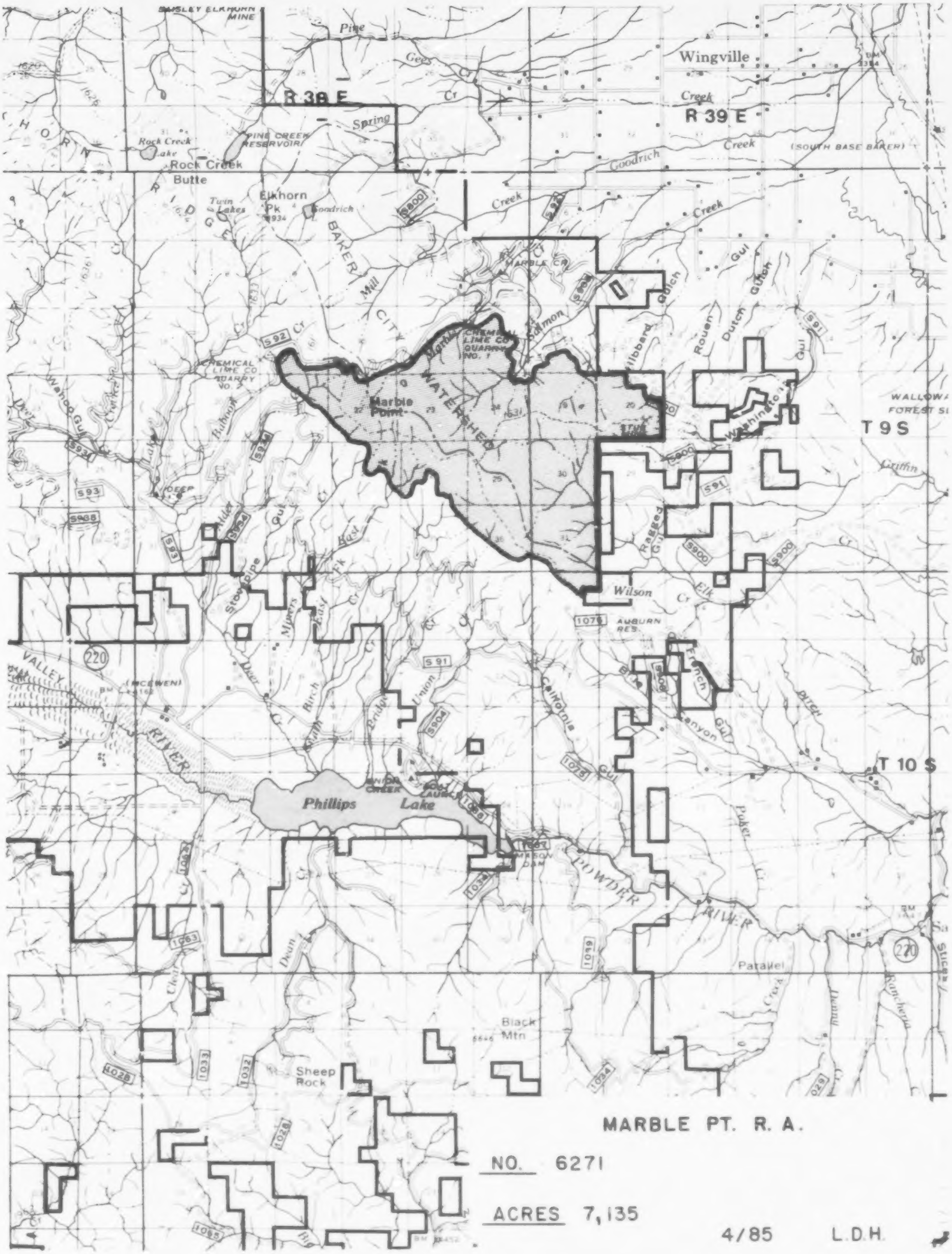
Capability. The area is natural-appearing and is similar in character to the adjacent Twin Mountain Roadless Area. However, being on the end of the mountain range it lacks the degree of ruggedness found in the central Elkhorns. There are opportunities for solitude but, because the sights and sounds of humans are not far, the sense of adventure and self-reliance are less than that found in the Twin Mountain Area or other large roadless areas.

The area is not grazed by livestock due to sensitive soils and lack of forage. There is some evidence of mineral potential as indicated by the Stub Mine which is within the area and the fact that gold has been found at lower elevations near the roadless area. The north end of the area is likely to have limestone deposits.

The area is popular for fall big-game hunting. Other recreation activities are discouraged within the watershed portion.

Availability. The area contains 168 acres of private land in one parcel. The area includes 4,930 acres of productive forest land containing a standing volume of 59 MMBF standing volume. The area has the potential to contribute .7 MMBF to the annual allowable harvest for the Forest.

Need. The area contains no ecosystems or features of interest that are not found in the nearby North Fork John Day (12 miles), Eagle Cap (40 miles) or Monument Rock (30 miles) wildernesses. As a part of the Elkhorn Range, there has long been interest in the area for wilderness but not because of features specific to the Marble Point Roadless Area. Some interest is likely to remain for many years.


BAISLEY ELKHORN MINE
Pine
Wingville
R 38 E
R 39 E
Spring
Creek
Rock Creek Lake
PINE CREEK RESERVOIR
Rock Creek Butte
Goodrich
(SOUTH BASE BAKER)
Twin Lakes
Elkhorn Pk
Goodrich
BAKER
CITY
WATERSHED
Mill
Marble Cr
Salmon
CHEMICAL LIME CO QUARRY NO. 1
CHEMICAL LIME CO QUARRY NO. 2
Marble Point
Gulch
Rouen
Dutch
Gulch
Washington
WALLOWA FOREST
T 9 S
Griffin
Wahoo
Baboon
Deer
Ragged
Wilson
Elk
Stovepipe
Myers
East Fk
AUBURN RES.
French
220
VALLEY
RIVER
(MCEWEN)
Birch
South
Union
California
Canyon
Gul
Phillips Lake
UNION CREEK
Powder
POWDER
RIVER
T 10 S
Poker
Parallel
270
Clear
Dean
Black Mtn
Sheep Rock
Deer

MARBLE PT. R. A.

NO. 6271

ACRES 7,135

4/85 L.D.H.

C-43

221

Monument Rock Roadless Area (6240)
5958 Acres

Description. The portion of the Monument Rock Roadless Area that was not declared wilderness in 1984 is located five miles south of Unity, Oregon, and about 24 miles southeast of Prairie City. Nearly the entire area is in the Bullrun Creek watershed, with Bullrun Mountain on the southeast and Miners' Ridge on the northwest.

This roadless area was evaluated during the RARE II process, and recommended for nonwilderness use as a result of that analysis. It was further studied before passage of the 1984 Oregon Wilderness Bill and again recommended for nonwilderness use.

It ranges from 5,200 feet at Bull Run Creek to about 7,300 feet at Bull Run Mountain. Soils are of volcanic origin. The north slopes of the area are mixed conifer tree stands with Douglas-fir predominating; south slopes are grass with scattered stands of ponderosa pine. Plant succession in the area has been altered by grazing.

Hundreds of lode mining claims exist throughout 3,500 acres of this roadless area. Old mining structures are scattered through the area, as are old wheel tracks. A jeep road, popular with woodcutters, runs along Bullrun Creek. Stock control fences are also throughout the area, which is primarily in the Bullrun Range Allotment. The area supports 340 AUM's annually.

Recreation opportunities consist primarily of fall big-game hunting. Moderately heavy snowmobile use exists in winter months. Table Rock Lookout, adjacent to this area, receives many visitors in summer. No extensive fishing opportunities occur here.

Approximately 1,500 acres of the area are within the roaded natural component of the recreation opportunity spectrum (ROS), 2,000 acres are considered semiprimitive motorized and 2,400 acres are in the semiprimitive nonmotorized component.

The area contains 2,783 acres of productive forest land with 25 MMBF of standing timber volume. The area has the potential to contribute .3 MMBF to the annual allowable harvest for the Forest.

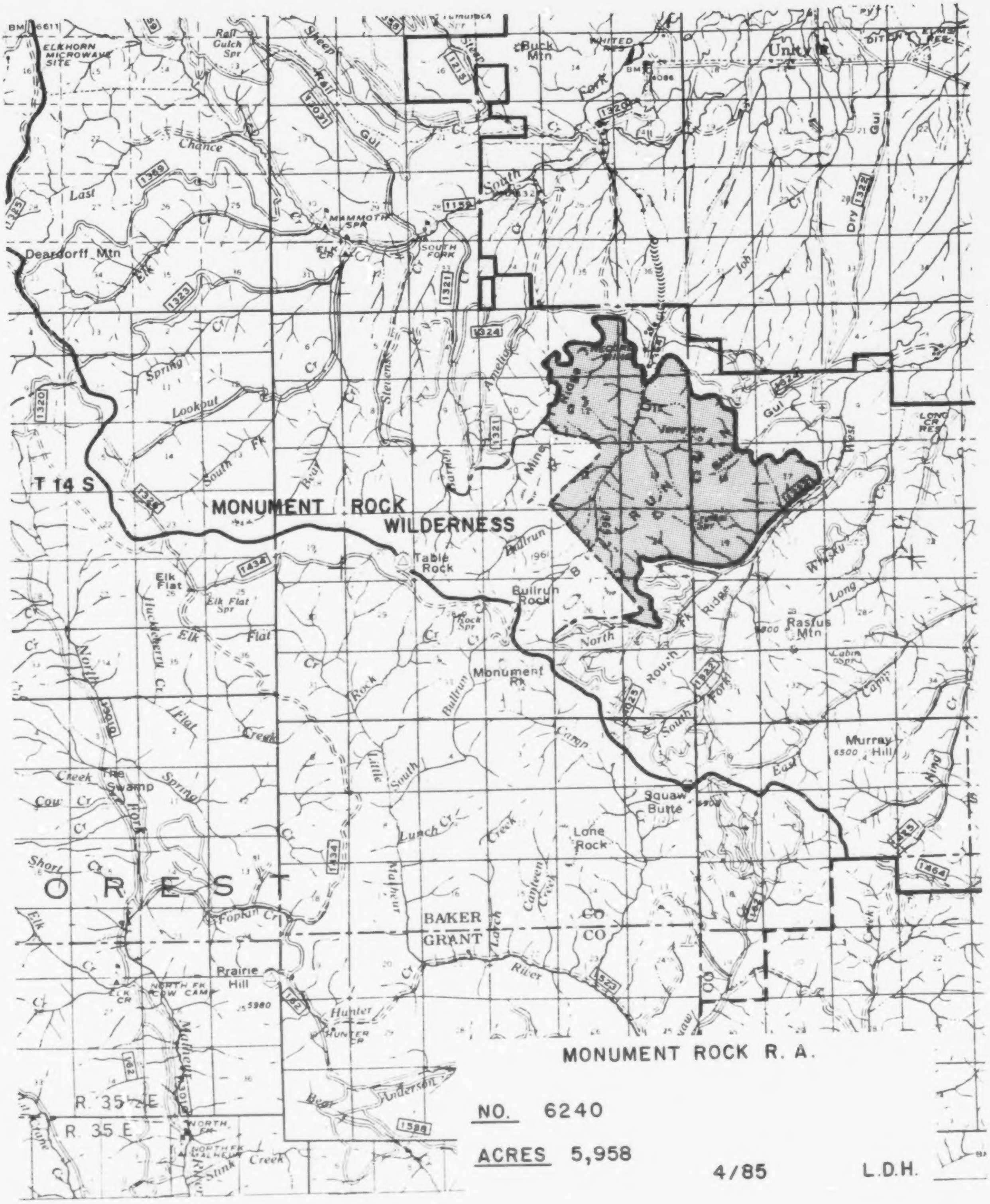
Capability/Availability. This area is surrounded on all sides by National Forest Systems land, and is about a mile from the Forest boundary to the north and northeast. It abuts the Monument Rock Wilderness on the southwest. The 1969 Rough Ridge Burn, 33,000 acres, is about two miles to the southeast; the 1939 Big Cow Burn is a few miles to the northwest. The lights of the town of Unity are visible at night from many of the high points in the area, with sights and sounds of miners and woodcutters frequent throughout.

AVAILABLE

Extensive horse logging took place in the 1940's immediately to the north of this roadless area, with continuing timber management having taken place since. Under the Burnt Powder Unit plan, (FEIS, 1979) the area was allocated for production of wood and forage, while maintaining optimum big game forage-cover relationships. It was also managed for conditions favorable for semi-remote big-game hunting opportunities.

Cultural resource sites, primarily old mining structures and ditches, are widespread in this area. No known threatened or endangered plant or animal species exist there.

Need. The area contains no features that are not found in greater abundance in the adjoining Monument Rock Wilderness or other nearby wildernesses. It was omitted from establishment in the Oregon Wilderness Act of 1984 because of the potential mineral values present. The area does have "backcountry" recreational value, which can be retained through non-wilderness designations. The only apparent need to preserve the wilderness character would be in the event it were deemed desirable to increase the size of the Monument Rock Wilderness in the future.


ELKHORN MICROWAVE SITE
Rail Gulch Spr
Sheep
Buck Mtn
Unity
Last Chance
MAMMOTH SPR
SOUTH FORK
Deardorff Mtn
Elk Cr
Spring Cr
Lookout
South Fk
T 14 S
MONUMENT ROCK
WILDERNESS
Table Rock
Bullrun Rock
Elk Flat
Elk Flat Spr
Huckleberry Cr
North Fork
Rastus Mtn
Monument Rk
Murray Hill
Squaw Butte
Lone Rock
The Swamp
Cow Cr
OREST
BAKER CO
GRANT CO
Prairie Hill
Hunter
Malheur
R. 35½ E
R. 35 E

MONUMENT ROCK R. A.

NO. 6240

ACRES 5,958

4/85

L.D.H.

R. 35 E

R. 36 E

R. 37 E

Mt. Emily Roadless Area (6277)
12,022 Acres

Description. This area was inventoried in the first Roadless Area Review and Evaluation. Because of local interest in the roadless recreation qualities and the timber resources involved, the Forest Service initiated a special study in 1972 to resolve the potential wilderness question. This study was abandoned in 1973 in order that the area could be studied as a part of the Grande Ronde Planning Unit. Through the Grande Ronde Planning Unit Environmental Impact Statement (1978) the area was allocated to nonwilderness uses. However, a large part of the area, essentially that part currently being considered, was designated as a special management unit which emphasized retention of the backcountry qualities. This portion of the area was removed from the timber harvest base.

The roadless area is six miles north of La Grande and 30 minutes to an hour drive from La Grande, depending on one of several available routes. It contains the upper reaches of Five Points Creek, the drainage which dominates the area. This stream runs southwest to where it joins the Grande Ronde River some six miles from the roadless area. Although the western slopes of Mt. Emily are included, the ridge and escarpment known as Mt. Emily are approximately one mile east of the eastern edge of the area.

In geologic history the areas was a plateau. It has since been dissected to the point where only remnants of the plateau remain and amount to approximately one-quarter of the area. The remainder is the steep canyon landscape of the upper Five Points Creek drainage. Elevations range from 3,200 feet to 5,400 feet. Soils are of volcanic origin, derived either from local bedrock or of ash from Cascade Range eruptions. Soils on the steep slopes tend to be unstable. The table lands and north slopes are timbered while most south and west slopes are nontimbered grasslands. The predominant timber species are Douglas-fir, white fir, and ponderosa pine.

The area is popular for big-game hunting, grouse hunting, and berry picking. Recreation use amounts to about 4,000 recreation visitor days per year. Approximately three-quarters of the area is in the semiprimitive motorized component of the recreation opportunity spectrum, while the remainder is considered roaded natural.

Capability. More than 90 percent of the perimeter is surrounded by National Forest land. The remaining 10 percent is contiguous to small private land parcels. Boundaries of the inventoried area generally follow ridgetop roads, section lines, or random lines which mark the edge of previous timber harvesting. Finding suitable boundaries would not be a problem if the area were designated wilderness. Because of its relatively small size, the visitor can perceive the entire area from many points along the perimeter and within the interior. However, because of its compact shape, there are opportunities for solitude not found in many similar sized areas. The knowledge that roads are never more than two miles away would detract from a sense of self-reliance or adventure for many.

The area is natural appearing with the exception of old railroad grades in the south end along drainage bottoms. These grades were used to remove timber from portions of the area in the 1920's and 1930's. With the exception of some damage that occurred to the stream channels and the grades themselves, the logging activity is not readily noticeable. There are several miles of jeep trails within the area and in some instances the jeep trails follow the old railroad grade.

There are no known threatened or endangered plant or animal species in the area. Elk and deer are the primary species of human interest although a variety of birds and mammals found in northeast Oregon are available. Five Points Creek is an anadromous fish stream and there is interest in improving the quality of the stream for fish use. At present there is a noticeable lack of riparian vegetation.

Availability. The area contains one 160-acre parcel of private land, all of which is timbered and undeveloped.

Although there are no known mineral deposits, there is presently one gas and oil lease. There have been no substantiated oil or gas discoveries and the likelihood of discovery is believed to be low. There are no known geothermal opportunities. Neither are there significant known cultural or historic values.

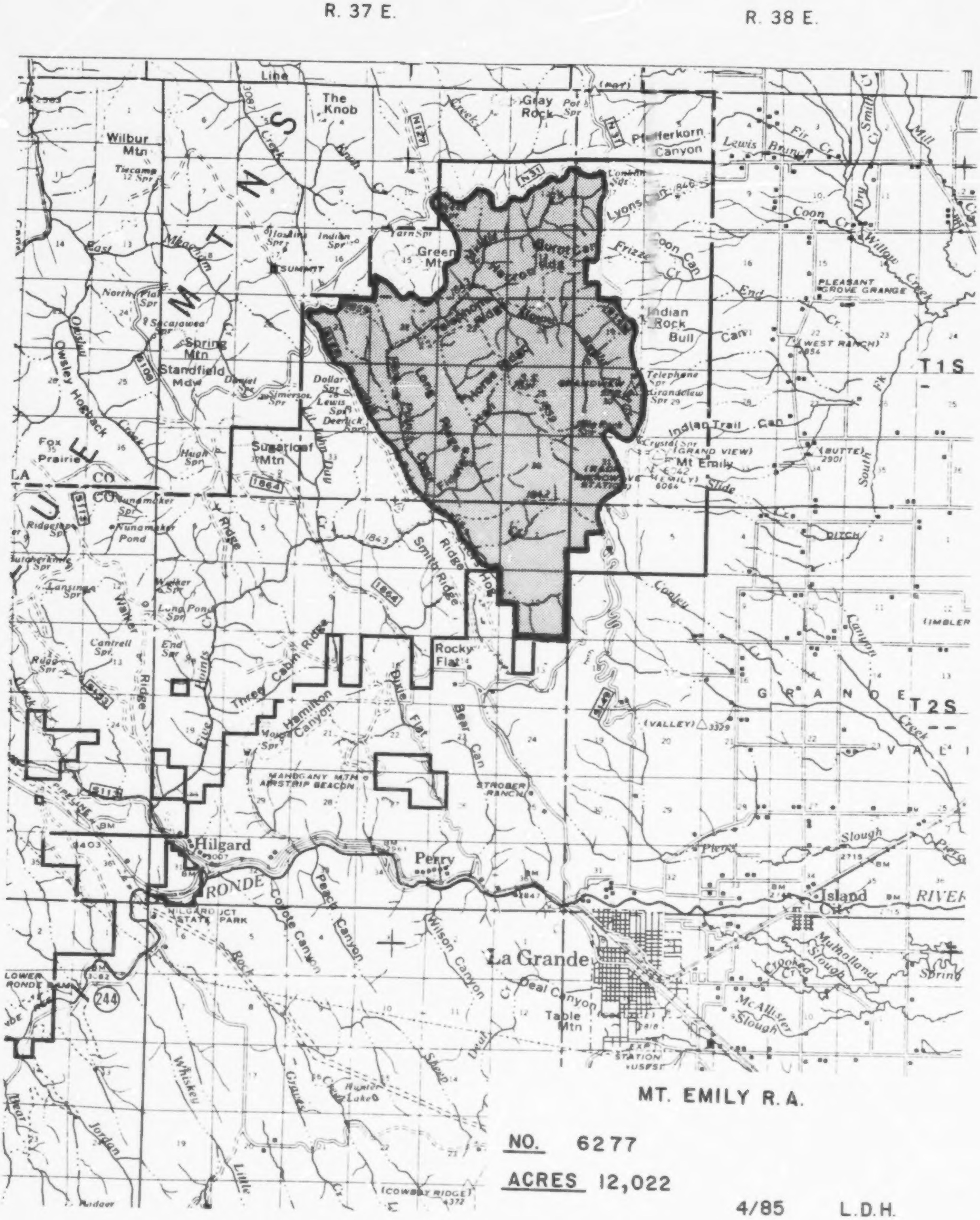
If the area were designated for wilderness, the types of recreation use would not be likely to appreciably change. There are no particular points of interest that would attract people such as lakes or geologic features. There are no outstanding opportunities for unusual adventure, excitement, or challenge. With wilderness designation, the recreation opportunity spectrum would not change.

The area is not grazed by livestock at present and there are no plans to permit grazing in the near future due to anticipated problems with riparian vegetation and wildlife. There are 8,119 acres of productive forest land. It contains 106 MMBF of standing timber and has a potential to contribute 1.3 MMBF to the annual timber harvest of the Forest.

Potential waterpower and water storage development sites are located in T.1S., R.37E., Section 14 and T.2S., R.37E., Section 3.

Need. The Mt. Emily Roadless Area lies some 20 miles west of the Eagle Cap Wilderness and 30 miles south of the Wenaha-Tucanon Wilderness. Each of these large wilderness areas contain the ecosystems found in the Mt. Emily area and in much greater amounts.

Public interest has been primarily at the local level. In 1978 the area was administratively allocated to roadless recreation uses through the Grande Ronde Planning Unit Environmental Impact Statement. There has been no Congressional interest in the area. Scoping during the Forest Land and Resource Management Plan has not revealed any renewed interest.


R. 37 E.
R. 38 E.
T1S
T2S
The Knob
Gray Rock
Pfefferkorn Canyon
Lewis
Fir Cr.
Smith Cr.
Mill
Wilbur Mtn
Lyons Can
Coon Can
Coon Cr
Willow Creek
Green Mt
Summit
Indian Rock
Bull Can
Pleasant Grove Grange
West Ranch
Spring Mtn
Standfield Mdw
Owsley
Hogback
Fox Prairie
Sugarloaf Mtn
Telephone Spr
Grandview Spr
Indian Trail Can
Mt Emily
Grand View
Butte
South Fk
Slide
Ditch
Cooley
Canyon
Imbler
Smith Ridge
Ridge
Walker
Three Cabin Ridge
Hamilton Canyon
Rocky Flat
Dixie Flat
Bear Can
Grande
Valley
Mahogany Mtn Airstrip Beacon
Strober Ranch
Hilgard
Perry
Ronde
Hilgard Jct State Park
Pierce
Slough
Island City
River
Peach Canyon
Coyote Canyon
Wilson Canyon
La Grande
Deal Canyon
Table Mtn
Crooked Cr
Mulholland Slough
McAllister Slough
Lower Ronde
244
Whiskey
Jordan
Graves
Hunter Lake
Sheep
Cowboy Ridge
Little
Five Points Cr
Nunamaker Spr
Lansing Spr
Cantrell Spr
End Spr
Long Pond Spr

MT. EMILY R.A.

NO. 6277

ACRES 12,022

4/85 L.D.H.

327

Reservoir Roadless Area (6284)

13,595 Acres

Description. This area adjoins the southeast boundary of Eagle Cap Wilderness. It is of varied topography, ranging from steep Sugarloaf and Russell Mountains (both over 7,400 feet) to 5,000-feet elevation at the creeks draining the area. It is about 12 miles north of the town of Halfway, Oregon, and several miles northeast of the old mining community of Cornucopia. East Pine Creek, Clear Creek and the east fork of Pine Creek all drain from the area. Granite outcroppings and glaciated valleys typical of the south faces of the Wallowa Mountains make up the northern portion of this area, which gradually slopes off to the south with intermixed patches of high elevation forest and meadows. Fish Lake and Fish Lake campground, accessed by Forest Road 66, are a half mile east of the eastern boundary of Reservoir Roadless Area.

Recreation use is mostly associated with fall big-game hunting, berry picking and fishing. No species of threatened or endangered plants or animals are known to inhabit the area. The area is two miles from the highly mineralized Cornucopia mining district, and is considered to have mineral deposits.

Recreation opportunities for mountain climbing, snowmobiling and cross-country skiing exist as well as for hunting, fishing and backpacking. Most of the area is considered to be within the semiprimitive motorized portion of the recreation opportunity spectrum (ROS).

This area contains four irrigation reservoirs of importance to a number of ranches outside the Forest boundary. It was partially within the Eagle Cap Wilderness prior to 1972 when it was removed to make more manageable boundaries and to exclude the reservoirs from the wilderness. Several miles of ditch line exist within the area, as well as a number of trails. Wheel tracks exist in the less steep portions of the area, used under entry permit for repair and maintenance of dams and ditches.

No anadromous fish runs have existed in the area since construction of Hells Canyon Dam. Native populations of rainbow and eastern brook trout provide recreational fishing opportunities throughout the Reservoir Roadless Area portion of the Pine Creek watershed. Tributaries from here substantially contribute to the high water quality of the entire watershed.

Soils are of granitic origin combined with volcanic ash in timbered areas. Ecosystems here are typical of the mid to high elevation levels of the Wallowa Mountains in the Eagle Cap Wilderness.

Capability. Reservoir Roadless Area is bounded on all sides by National Forest land. Sights and sounds of human activities would be noticeable on the eastern and western boundaries because of the proximity to mining areas and a campground; the central and north portions of the area offer opportunities for primitive hiking, and serve as a buffer for the Eagle Cap Wilderness.

Availability. The main recreation opportunity is for primitive big-game hunting. Roads and jeep trails into the area are generally closed during big-game hunting seasons.

Several cultural resource sites exist near the west side of the Reservoir area, including historic mining structures. Select ("superior") trees* have been designated throughout the area within a quarter mile of trails and wheel tracks.

The Pine Valley range allotment covers nearly the entire area, with Duck Creek Allotment in a portion of it. These range allotments are used primarily for late summer forage for domestic cattle.

The area includes 4,845 acres of productive forest land with a standing timber volume of 65 MMBF. It has the potential to contribute .8 MMBF to the annual allowable timber harvest for the Forest.

All but about 1,000 acres of this roadless area is being managed under the Burnt Powder Unit Plan (FEIS 1979) to provide dispersed recreation opportunities. The acreage outside of the dispersed recreation management area lies within the boundaries of the Trail Timber Sale, scheduled for 1985.

Potential waterpower and water storage development sites are located in T.6S., R.45E., Section 12; and T.5S., R.46E., Section 29. The proposed facility is to be a pumping site and storage facility.

Need. Eagle Cap Wilderness, 361,000 acres, is immediately to the north. The Oregon portion of the Hells Canyon Wilderness is 13 miles to the east. These two large wilderness areas contain the same ecosystems, land forms, and features of the Reservoir Roadless Area, and in greater amount.

The area was eliminated from the Eagle Cap Wilderness in 1972 by Congress due to nonconforming uses (reservoirs and ditches). These uses are still present. It was reconsidered during formulation of the Oregon Wilderness Bill of 1984. Conditions have not changed and there does not appear to be any particular reason to protect the area for future wilderness consideration.

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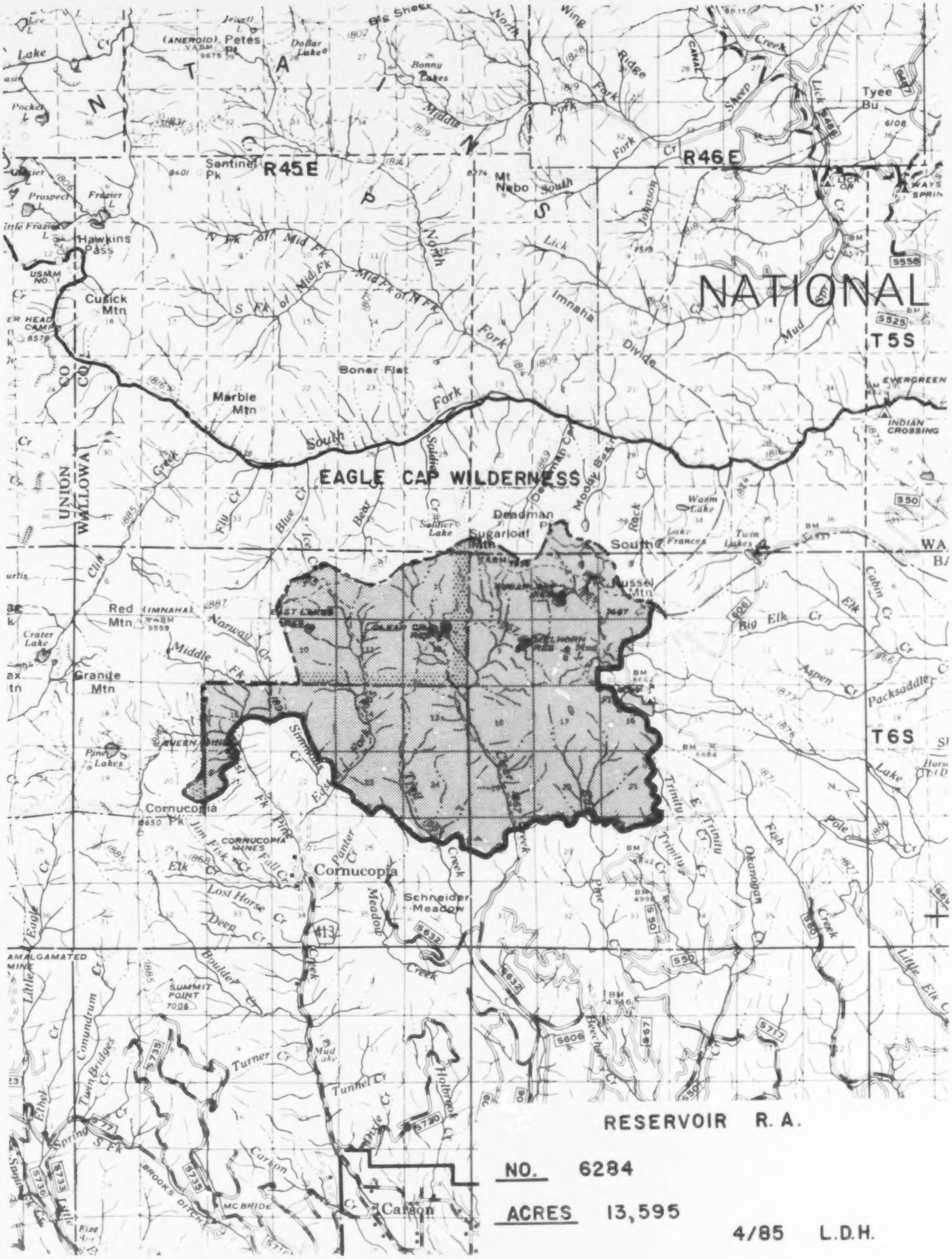
*Trees which exhibit superior growth and form, possibly due to their genetic makeup.

229


R45E
R46E
T5S
T6S
NATIONAL
EAGLE CAP WILDERNESS
Petes Pt
Bonny Lakes
Dollar Lake
Sentinel Pk
Mt Nebo
Hawkins Pass
Frazier L
Prospect
Cusick Mtn
Tyee Bu
Boner Flat
Marble Mtn
UNION
WALLOWA
Imnaha Divide
South Fork
Soldier Lake
Deadman Pt
Sugarloaf Mtn
Russel Mtn
Warm Lake
Lake Frances
Twin Lakes
Big Elk Cr
Aspen Cr
Packsaddle Cr
Red Mtn
Crater Lake
Granite Mtn
Pine Lakes
Norway Cr
Middle Fk
Cornucopia Pk
Cornucopia Mines
Cornucopia
Schneider Meadow
Lost Horse Cr
Deep Cr
Boulder Cr
Summit Point 7006
Amalgamated Mine
Conundrum Cr
Twin Bridges
Turner Cr
Mud Lake
Tunnel Cr
Holbrook Cr
Dixie Cr
Carson
McBride
Brooks Ditch
Evergreen
Indian Crossing
Trinity Cr
Okanogan
Fish Creek
Pole Cr
Little Elk Cr
Eagle Cr
413

RESERVOIR R.A.

NO. 6284

ACRES 13,595

4/85 L.D.H.

C-52

Tope Creek Roadless Area (G03)
8,674 Acres

Description. This area was inventoried during the first Roadless Area Review and Evaluation and allocated to nonwilderness uses through the Wallowa Valley Planning Unit Environmental Impact Statement (Land Management Plan) of November 3, 1975. The potential wilderness character of the area remains essentially unchanged since that time. It lies some 20 miles northwest of Enterprise and can be reached via Wallowa County Road No. 500, the Powwatka Ridge Road.

The area includes the upper reaches of Mud Creek, including Tope Creek, a major tributary. Mud Creek runs northerly and enters the Grande Ronde River, some five miles north of the roadless area. The canyons within the area are deep and precipitous, typical of many of the Snake River and Grande Ronde River breaks. Most of the north and east slopes, approximately 40 percent of the area, are timbered with Douglas-fir being the dominant species. The south and west slopes are of grass and shrub types.

Most of the area is considered to be within the semiprimitive nonmotorized portion of the recreational opportunity spectrum. Recreation use is almost exclusively for big-game hunting during elk and deer seasons and amounts to approximately 400 recreation visitor days per year. Other than hunting, the perimeter of the area offers interesting views of rugged canyon topography. However, because it is relatively inaccessible, it does not share the viewing popularity of nearby Joseph Canyon which lies along a State highway. Most of the area is used as winter range by deer and elk. Mud and Tope Creeks are anadromous fish streams and provide spawning habitat for salmon and steelhead.

Capability. Because of its narrow, relatively small sized, irregular configuration, and many miles of boundary, manageability of the area as wilderness would be difficult. Because of its shape and size, a visitor can perceive the entire area from nearby points on the perimeter. The sounds of motor vehicles would often be audible from much of the interior of area. There is a sense of solitude within the depths of the canyons, particularly in the timbered portions, and traversing the difficult terrain would contribute to a spirit of adventure. The sense of self reliance would be low for many users because of the relatively small size of the area and correspondingly short distances to roads.

The interior of the area remains natural appearing except for fences, livestock watering facilities, and livestock trails. There are no known special features or notable opportunities for scientific, archaeological, or historical study, nor are there known threatened or endangered species of plants or animals.

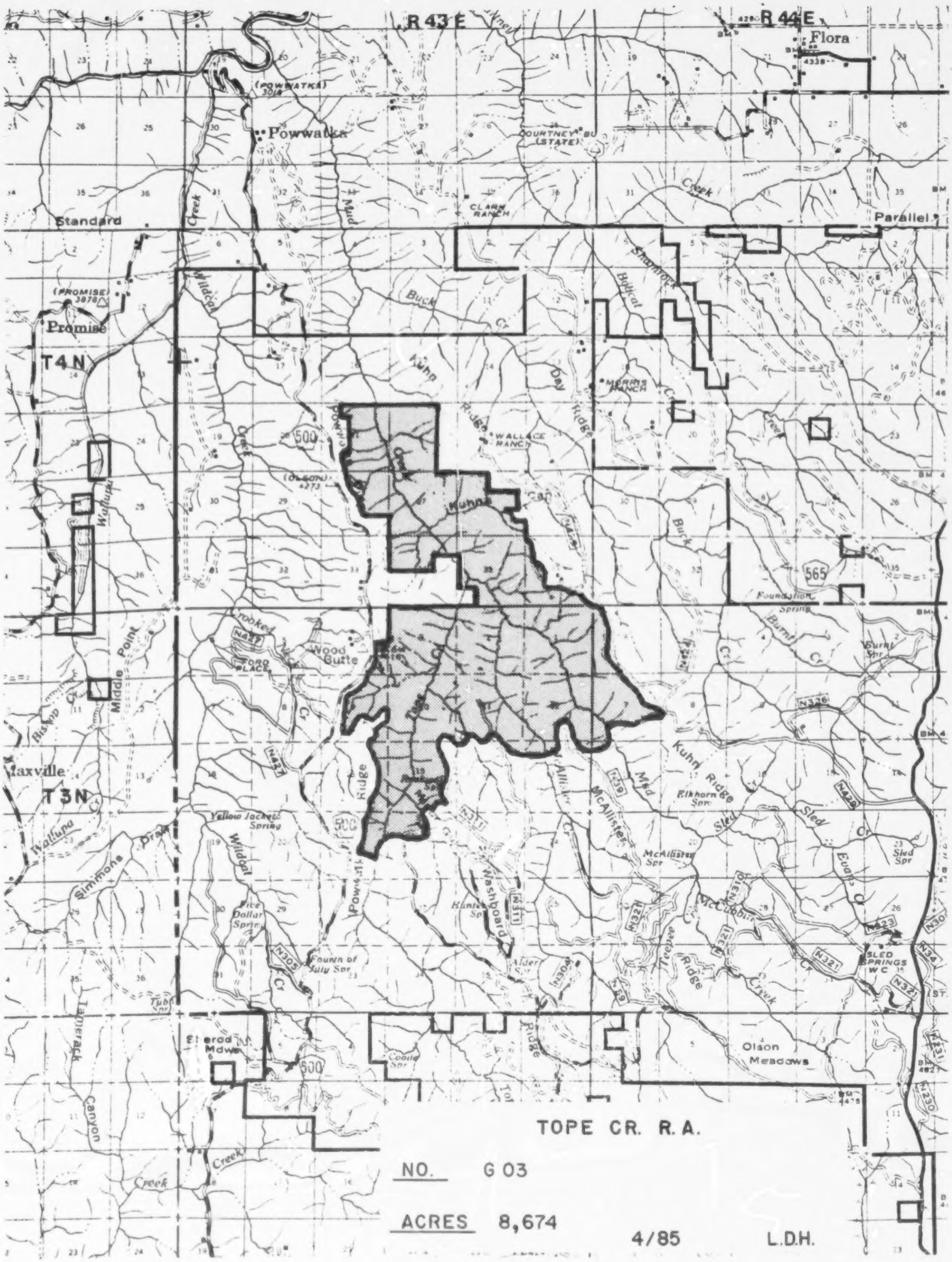
Availability. Recreation opportunity would remain unchanged by wilderness classification, but an increase in use would be probable because of the publicity associated with classification. Increased use for hiking and viewing could be expected. The recreation opportunity spectrum classification would be unchanged.

The area provides 1,200 animal unit months of livestock grazing annually. There is no evidence of mineralization. Nearly half of the perimeter abuts private land.

The area contains 1,820 acres of productive forest land with 13 MMBF of standing timber. It has the potential to add .2 MMBF to the annual timber harvest for the Forest.

Need. The Eagle Cap Wilderness lies 22 miles to the south, the Hells Canyon Wilderness is 30 miles east of the area and Wenaha-Tucannon Canyon lies 20 miles to the northwest. These large nearby wildernesses provide the ecosystems that are found in the Tope Creek Roadless Area and in much greater amount.

The area was evaluated by the public during RARE and during unit planning (Wallowa Valley Planning Unit). Interest in the area for wilderness has been low; the only expressions favoring wilderness coming from those who suggested all roadless areas be placed in wilderness.


R 43 E
R 44 E
Flora
Powwatka
Standard
Parallel
Promise
T4N
T3N
Maxville
Buck Cr
Kuhn Ridge
Dey Ridge
Morris Ranch
Wallace Ranch
Clark Ranch
Courtney Bu (State)
Bobcat
Shamrock
Burnt Cr
Foundation Spring
Wood Butte
Crooked Cr
Ford Place
Wildcat Cr
Mud Cr
Washboard
McAllister Spr
Elkhorn Spr
Sled Cr
Sled Springs W C
Evans Cr
McCubbin Cr
Teepee Ridge
Yellow Jacket Spring
Five Dollar Spring
Fourth of July Spr
Alder Spr
Simmons Draw
Wallupa
Middle Point
Bishop Cr
Tamarack
Canyon Creek
Sherod Mdws
Olson Meadows
500
565
600

TOPE CR. R.A.

NO. G 03

ACRES 8,674

4/85 L.D.H.

Twin Mountain Roadless Area (6273)
60,903 Acres

Description. This area was considered in RARE and RARE II, but was not selected for wilderness study. However, some 14,500 acres were placed in the North Fork John Day Wilderness by The Oregon Wilderness Bill of 1984. The carving out of this wilderness addition resulted in isolating two western portions of the area (see map) including Mt. Ireland. The remainder of the area is primarily within the Powder River Drainage. The roadless area lies about 20 miles west of Baker and is within Baker and Grant Counties. It encompasses most of the Elkhorn Mountain Range. Similar to the Wallowa Mountains (Eagle Cap Wilderness) some 40 miles to the northeast, the area is characterized by jagged mountain peaks which reach above timberline, deep glaciated canyons, cirque basins with small lakes, and numerous headwaters of streams including Cracker Creek, Dutch Flat Creek, North Fork of Powder River, and Rock Creek. Five of the lakes have been enlarged by low dams to increase storage for downstream irrigation. Also included is a major portion of the Baker City Watershed, a pipeline, and a City-owned building.

The Elkhorn Range is the second largest geologic batholith in Oregon (second to the Wallowa Mountains). Soils are formed from granodiorite parent material and volcanic ash from Cascade volcanic eruptions. Elevations range from 5,000 to 8,900 feet. Canyons and north slopes below 8,000 feet are timbered. Along with the Marble Point Roadless Area, it forms a scenic backdrop from the Baker Valley on the east and the Sumpter Valley on the west.

Most of the lakes and streams provide trout fishing and the area is popular in the fall for big-game hunting. Several trails are popular for hiking and off-road recreational users. Included is the Elkhorn Crest National Recreation Trail. Approximately 30,000 acres of the area are in the semiprimitive motorized component of the recreation opportunity spectrum while 21,000 acres are considered semiprimitive nonmotorized and 8,900 acres are in the roaded natural component.

Capability. The area is natural appearing with the exception of wheel track roads, evidence of prospecting and mining, dams on several of the small lakes, and areas along the perimeter where woodcutting has encroached. Approximately 591 acres is excluded from the area for expansion of the Anthony Lake Ski Area.

Because the area is relatively large, there are ample opportunities for solitude. There is ample opportunity for experiencing a sense of self-reliance and adventure. There are many opportunities for panoramic views from the popular Elkhorn Crest Trail and other points.

The area contains a wide variety of wildlife with elk, deer, and grouse being the primary game species. Mountain goats transplanted into the Elkhorn Range have survived three years. Officials of the Oregon Department of Fish and Wildlife are optimistic that a herd will become established.

Availability. The area contains 22,775 acres of productive forest land containing 269 MMBF standing timber volume. The area has potential to contribute 3.4 MMBF to the annual allowable harvest for the Forest. The area is mineralized as evidenced by approximately 200 mining claims and many prospects and old mines. This was the primary factor in eliminating the area from wilderness consideration in RARE II. Gold is the most sought-after mineral, but copper, lead, tungsten, antimony, and molybdenum are also found. Although exploration continues, there are currently no operating mines in the roadless area.

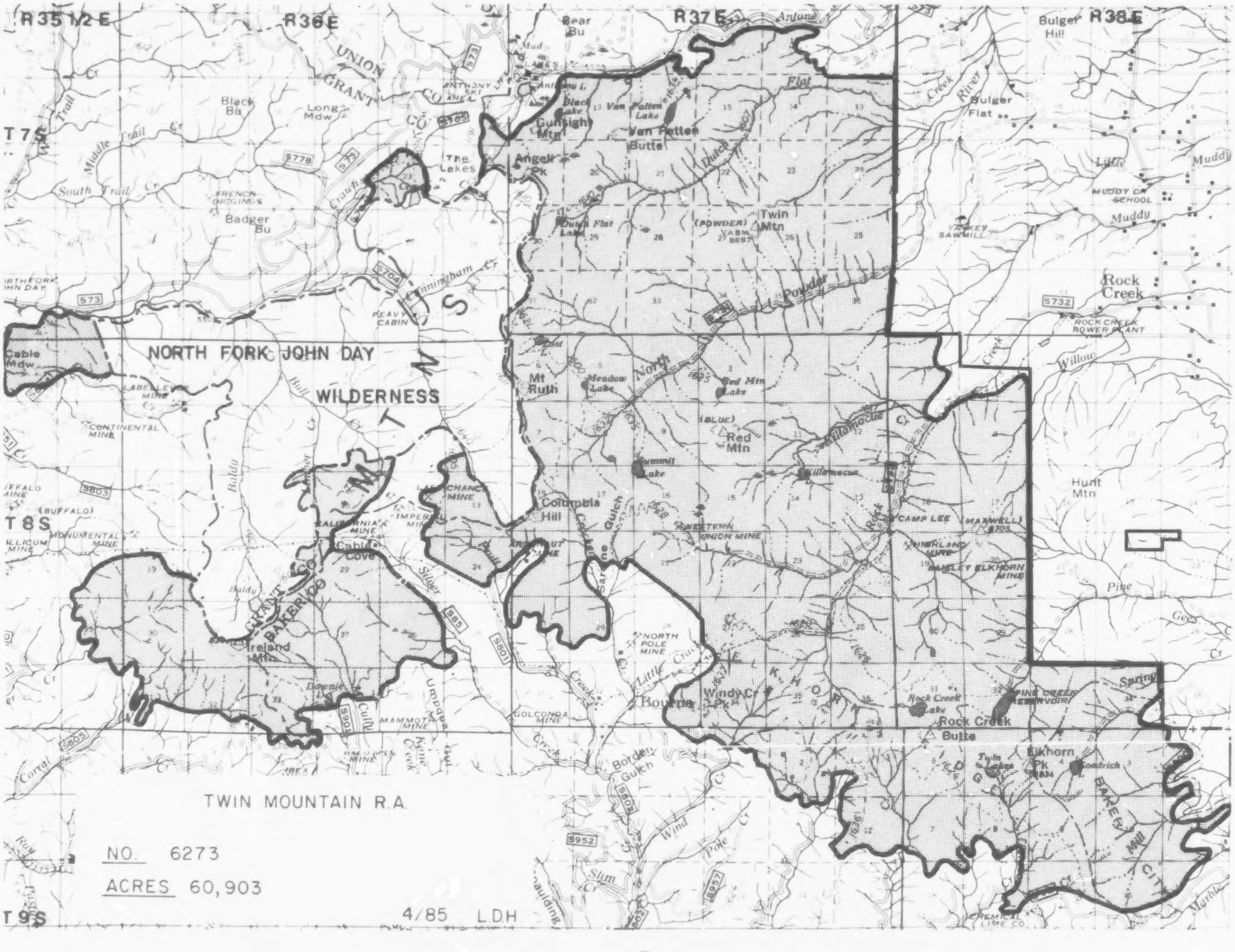
Most of the area is not suitable for grazing due to erodable soils, lack of forage, or rugged terrain. Several areas at lower elevations are grazed as part of livestock allotments.

The scattered patented mining claims total to over 1,300 acres of private land within the roadless area.

Potential water power and water storage developments sites are located in T.7S., R.36E., Section 31; T.8S., R.36E., Section 12; T.7S., R.37E., Section 13; T.8S., R.37E., Section 18; T.8S., R.38E., Section 31; and T.8S., R.38E., Section 8.

Need. There are apparently no ecosystems that are not found more abundantly in the Eagle Cap Wilderness or the adjacent North Fork John Day Wilderness. There are no notable opportunities for historic or scientific study, but there are notable geologic features and landforms that are of interest to many people.

There has long been interest in the area for wilderness. There is general agreement that the area has terrain and other features that are usually associated with "wilderness character." The interest in the area for wilderness is not likely to subside within the near future.


R35 1/2 E
R36 E
R37 E
R38 E
T7S
T8S
T9S
UNION
GRANT
CO
Bear Bu
Mud Lakes
Anthony Ski Area
Anthony L.
Black Lake
Van Patten Lake
Gunsight Mtn
Van Patten Butte
Angell Pk
Flat
Dutch
Bulger Hill
Bulger Flat
Muddy
Muddy Cr School
Yankee Sawmill
Black Bu
Long Mdw
Middle Trail Cr
South Trail Cr
French Diggings
Badger Bu
The Lakes
Dutch Flat Lake
(POWDER)
Twin Mtn
Powder
Rock Creek
Rock Creek Power Plant
Willow
North Fork John Day
Cunningham Cr
Peavy Cabin
Cable Mdw
NORTH FORK JOHN DAY
WILDERNESS
Labelle Mine
Continental Mine
Mt Ruth
Meadow Lake
North
Red Mtn Lake
(BLUE)
Red Mtn
Killamacue Cr
Summit Lake
Buffalo Mine
(BUFFALO)
Monumental Mine
Chance Mine
Imperial Mine
California Mine
Columbia Hill
Gulch
Western Union Mine
Camp Lee
(MAXWELL)
Cable Cove
Baldy
Hunt Mtn
Pine
GRANT CO
BAKER CO
Ireland Mtn
Silver
North Pole Mine
Little Cr
Windy Cr Pk
ELKHORN
Rock Creek Lake
Pine Creek Reservoir
Rock Creek Butte
Spring
Bourne
Golconda Mine
Mammoth Mine
Umpqua Gul
Baldwin Mine
Border Gulch
Corral
Twin Lakes
Elkhorn Pk
Goodrich
BAKER CITY
Mill
Wind
Pole Cr
Slim Cr
Chemical Lime Co
Marble

TWIN MOUNTAIN R.A.

NO. 6273

ACRES 60,903

4/85 L.D.H

Upper Catherine Creek Roadless Area (6281)
6,844 Acres

Description. This area was not inventoried in RARE. However, it was inventoried in RARE II. It was evaluated for wilderness through the Grande Ronde Unit Planning process and allocated to nonwilderness in 1978 (FEIS, Grande Ronde Planning Unit). It was therefore eliminated from the final RARE II inventory. It was again considered by Congress in 1984 when approximately 65 percent of the former 15,000 acre area was added to the Eagle Cap Wilderness by the Oregon Wilderness Bill of 1984.

The remaining area is generally the lower elevation portion, although elevations do range from as high as 7,400 feet near Burger Butte, to 4,200 feet near the North Fork Catherine Creek Campground.

The area contains portions, one to two miles, of several streams including the North and Middle Forks of Catherine Creek, Pole Creek, and Sand Pass Creek. Virtually all species of trees on the Forest are found here, with Douglas-fir, ponderosa pine, and grand fir comprising most of the major commercial volume. The area is considered above-average timber site for the Wallowa-Whitman. The entire area is grazed by cattle, being part of the Catherine Creek livestock allotment.

Three trails pass through the area, providing access to the Eagle Cap Wilderness. Primary on-site recreation use is for big-game hunting and fishing. The North Fork of Catherine Creek is an anadromous fish stream, providing habitat for steelhead. Members of the Umatilla Confederated Tribe fish the stream as part of their ceded land rights.

Approximately 2,000 acres of the area are within the roaded natural component of the recreation opportunity spectrum (ROS) while 3,700 acres are considered semiprimitive motorized and 1,200 acres are in the semiprimitive nonmotorized component.

Capability. The area is natural appearing. There are no special features or notable known opportunities for scientific, archaeological or historical study, nor are there known threatened or endangered species of plants or animals.

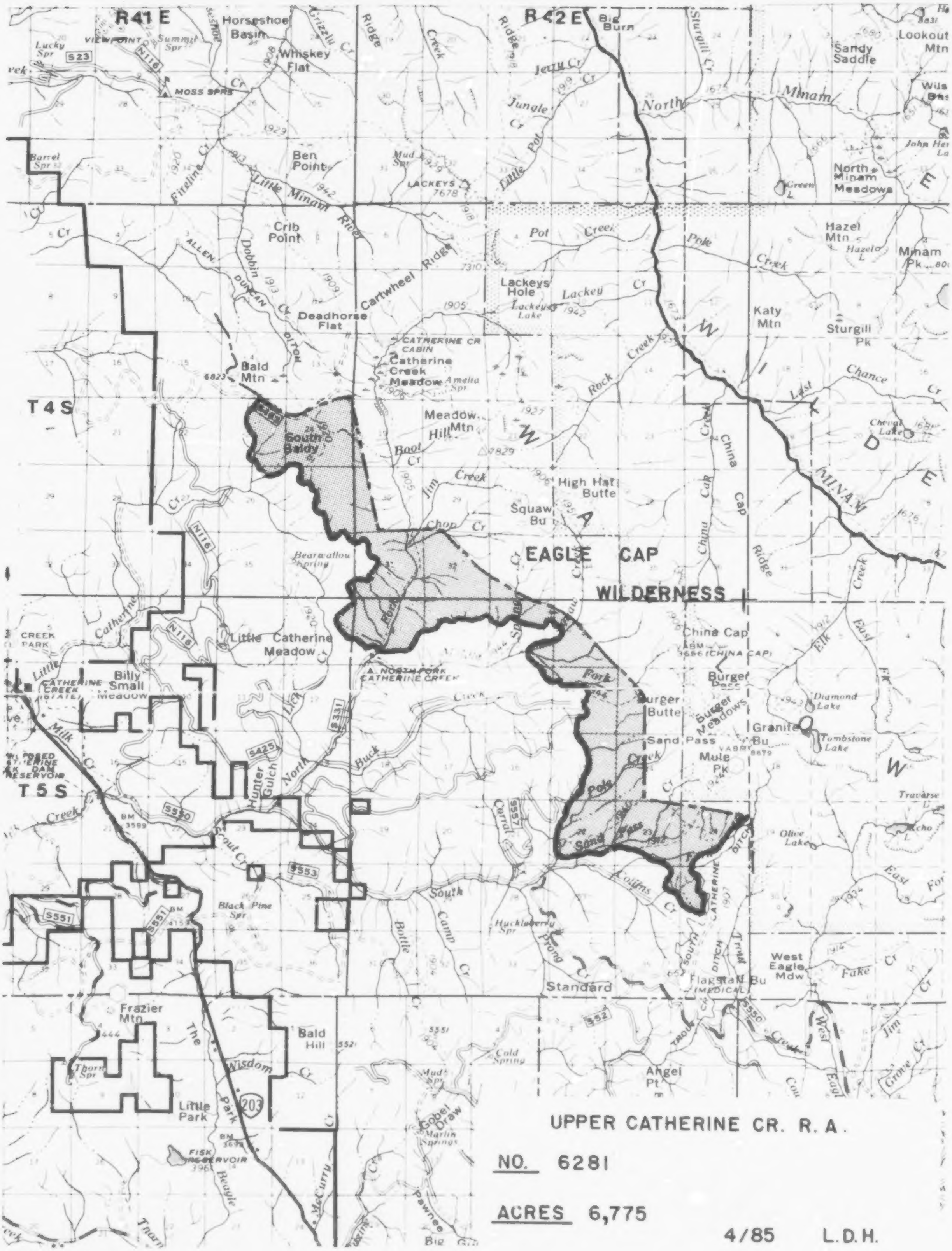
Because the area amounts to a mile-wide fringe along the edge of the existing wilderness, a visitor is never far from roads or sounds of humans. Therefore, within the roadless area proper, there is not high opportunity for experiencing a sense of self-reliance or solitude.

Availability. The area contains no private land.

There are 5,527 acres of productive forest land with a standing timber volume of 52 MMBF. The area has potential to contribute .6 MMBF to the annual allowable harvest for the Forest.

Need. The area contains no ecosystems or special land features that are not found more abundantly in the adjacent Eagle Cap Wilderness.

Although the Oregon Wilderness Bill included the more attactive parts of the original roadless area in wilderness, there is still some sentiment for adding the remainder to wilderness as well. However, there is apparently no reason to add the area to the wilderness unless the purpose is simply to make the Eagle Cap larger.


R41 E
R42 E
T4S
T5S
Horseshoe Basin
Whiskey Flat
Lucky Spr
Summit Spr
Viewpoint
Moss Sprs
Barrel Spr
Ben Point
Little Minam River
Lackeys
7678
Crib Point
Allen
Dobbin Cr
Duncan Ditch
Cartwheel Ridge
Deadhorse Flat
Bald Mtn
6823
Catherine Cr Cabin
Catherine Creek Meadow
Ameila Spr
Meadow Mtn
South Baldy
Boot Cr
Jim Creek
Chop Cr
Bearwallow Spring
High Hat Butte
Squaw Bu
Pot Creek
Lackeys Hole
Lackeys Lake
Lackey Cr
Rock Creek
Jungle Cr
Little Pot
Jerry Cr
Big Burn
Sturgill Cr
North Minam
North Minam Meadows
Sandy Saddle
Lookout Mtn
Green L
Hazel Mtn
Hazel L
Minam Pk
Katy Mtn
Sturgill Pk
Last Chance Cr
Pole Creek
China Cap Creek
China Cap Ridge
Minam
EAGLE CAP WILDERNESS
W I L D E R N E S S
Elk Creek
China Cap
Burger Pass
Burger Butte
Burger Meadows
Sand Pass
Mule Pk
Granite Bu
Diamond Lake
Tombstone Lake
Olive Lake
Echo L
Traverse L
East Fork
Creek Park
Catherine Creek State Park
Little Catherine Meadow
Billy Small Meadow
North Fork Catherine Creek
Milk Cr
Hunter Gulch
North Fork
Buck Creek
Pole Creek
Sand Pass
Collins Cr
South Catherine Ditch
South Fork
Scout Cr
Black Pine Spr
Bottle Cr
Camp Cr
Carroll Cr
Huckleberry Spr
Prong Cr
Standard
Flagstaff Bu (Medical)
West Eagle Mdw
Fake Cr
Trout Cr
Angel Pt
Cold Spring
Bald Hill
Frazier Mtn
Thorn Spr
The Wisdom Cr
Little Park
Fisk Reservoir
Beagle
McCurry Cr
Gobel Draw
Marlin Springs
Pawnee
N116
S23
S331
S425
S550
S553
S551
552
203

UPPER CATHERINE CR. R.A.

NO. 6281

ACRES 6,775

4/85 L.D.H.

239

Roadless Areas Shared With Umatilla National Forest

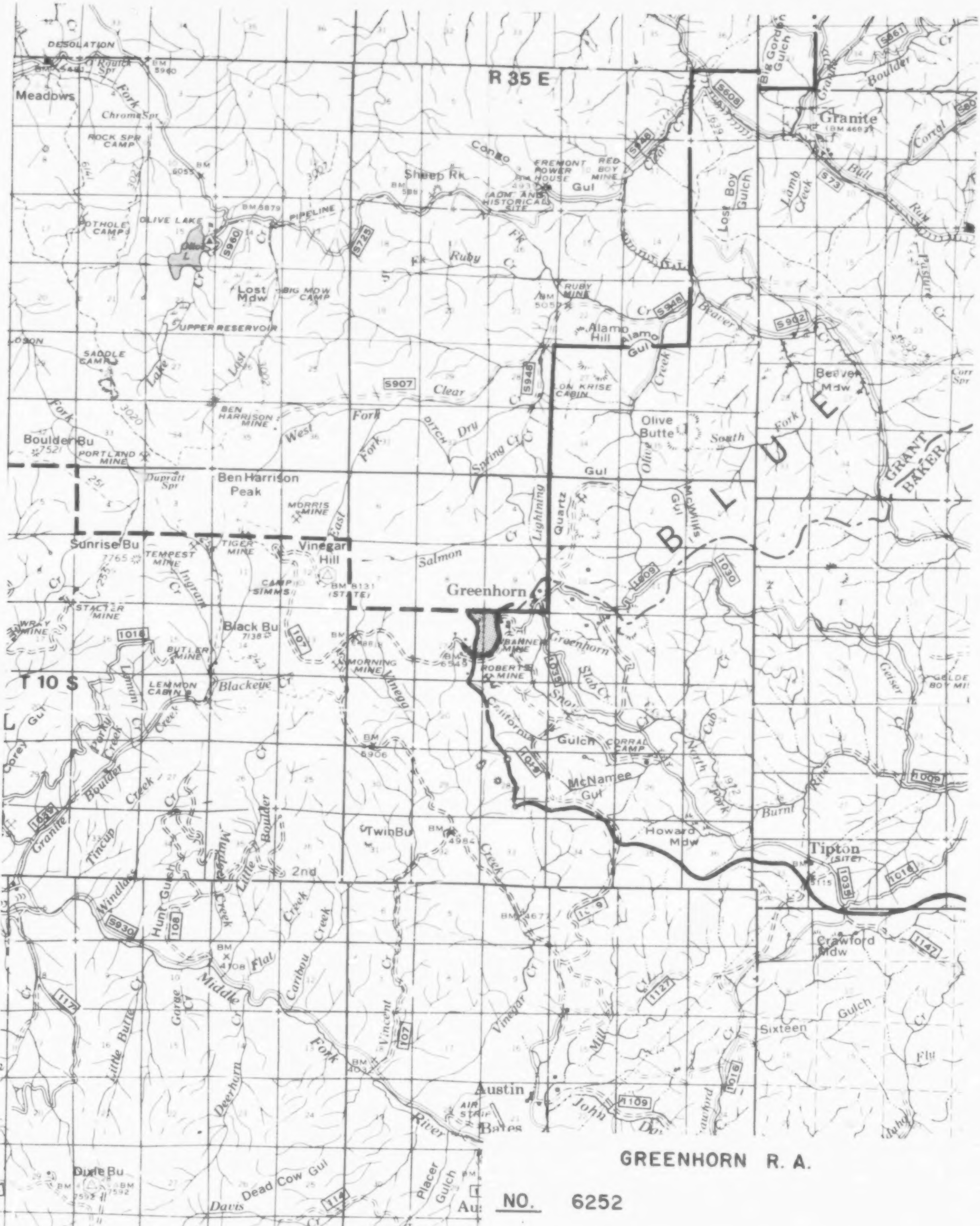
The following areas are fragments of roadless areas which lie primarily on the Umatilla National Forest (Greenhorn also extends onto the Malheur National Forest). The Wallowa-Whitman portions are insignificant insofar as describing or evaluating the roadless areas and do not contain features that would have bearing in an analysis of potential wilderness attributes. The reader is referred to the Umatilla National Forest Land and Resource Management Plan for descriptions and evaluations of these roadless areas.

All of the roadless areas listed below are within the roaded natural component of the recreation opportunity spectrum.

The combined standing timber volume of these roadless areas amounts to 40 MMBF. Combined they would contribute an estimated .5 MMBF to the allowable harvest for the Forest.

Name	Number	Acres
Tower	256	85
Hellhole	261	513
Greenhorn	252	161
North Mt. Emily	262	772
Squaw	601	3,220

The Grande Ronde Roadless Area is also shared with the Umatilla Forest. A separate description for it is provided earlier in this section.

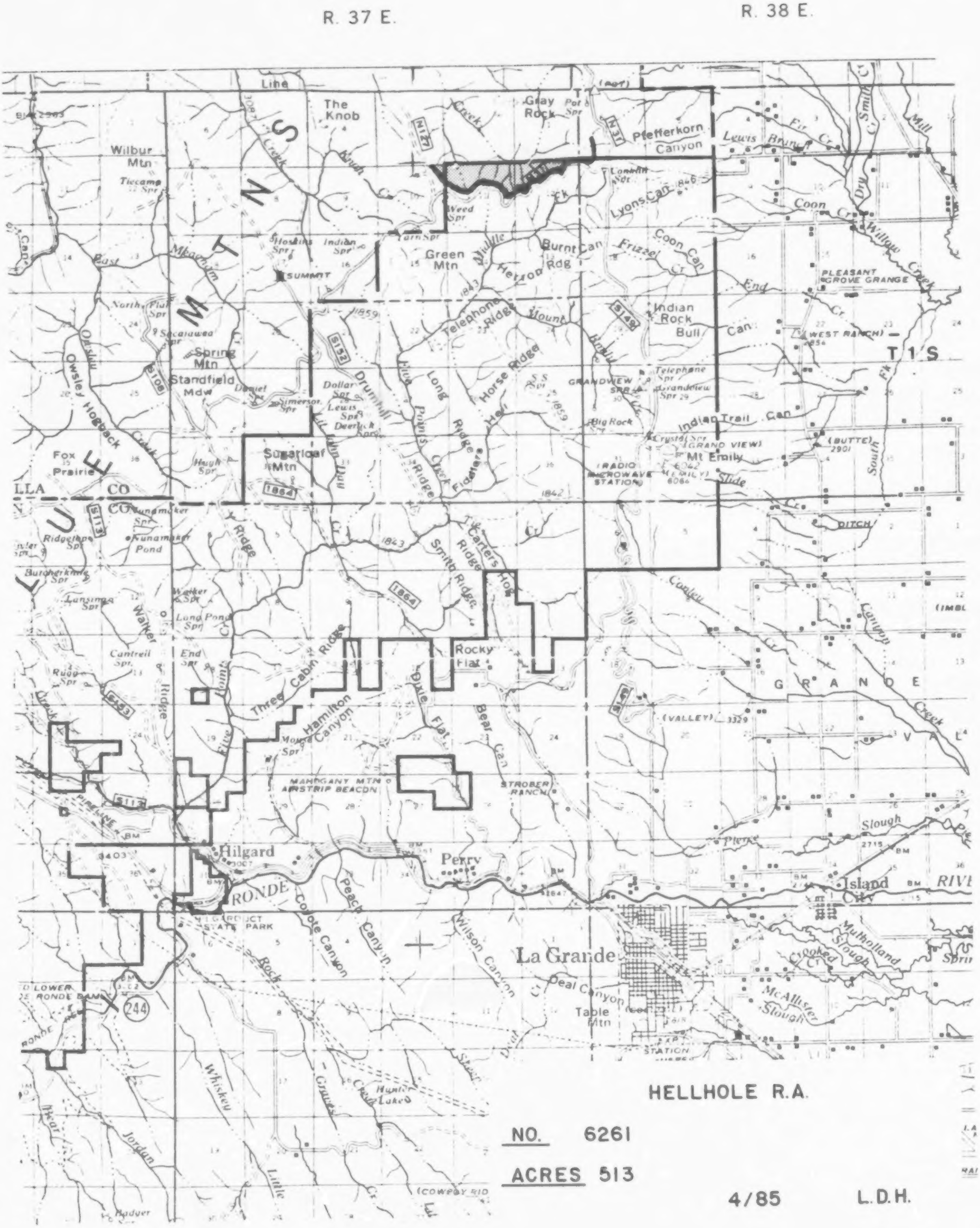

R 35 E
T 10 S
Desolation
Meadows
Olive Lake
Lost Mdw
Upper Reservoir
Saddle Camp
Boulder Bu
Ben Harrison Peak
Sunrise Bu
Vinegar Hill
Black Bu
Greenhorn
Granite
Sheep Rk
Fremont Power House
Red Boy Mine
Ruby Mine
Alamo Hill
Olive Butte
Beaver Mdw
Grant
Baker
Blue
Tipton (Site)
Howard Mdw
Crawford Mdw
Twin Bu
Austin
Bates
Dixie Bu
Dead Cow Gul
Placer Gulch
Sixteen Gulch
McNamee Gul
California Gulch
Corral Camp
Middle Fork
Lemmon Cabin
Butler Mine
Stalter Mine
Tempest Mine
Tiger Mine
Morris Mine
Camp Simms
Morning Mine
Roberts Mine
Portland Mine
Ben Harrison Mine
Lon Krise Cabin

GREENHORN R. A.

NO. 6252

ACRES 161

4/85 L.D.H.

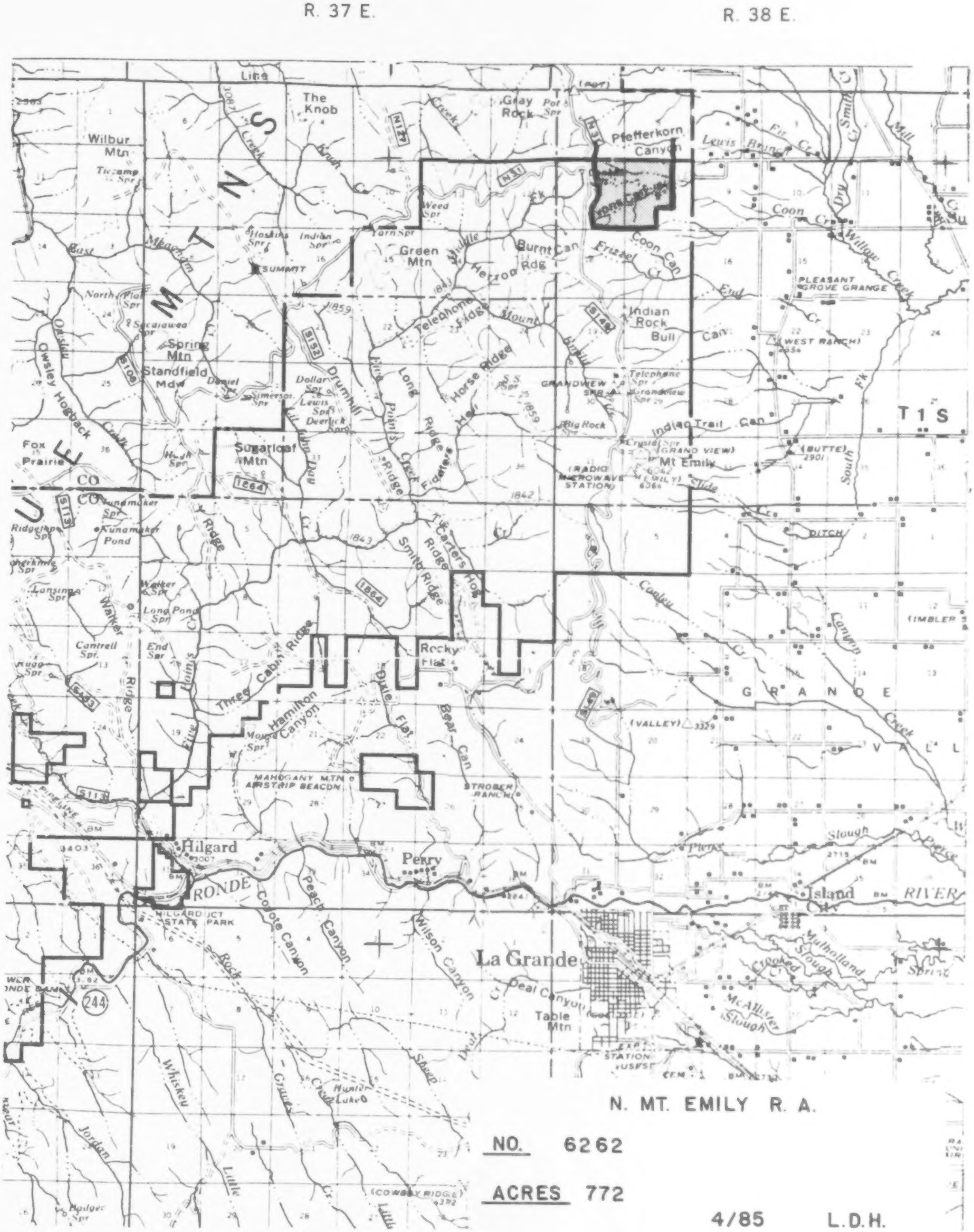

R. 37 E.
R. 38 E.
T 1 S
BLUE MTNS
The Knob
Gray Rock
Pfefferkorn Canyon
Lewis Branch
Wilbur Mtn
Green Mtn
Herzog Ridge
Burnt Can
Lyons Can
Coon Can
Pleasant Grove Grange
Indian Rock
Telephone Ridge
Spring Mtn
Standfield Mdw
Sugarloaf Mtn
Fox Prairie
Horse Ridge
Long Ridge
Mt Emily
Grandview
Radio Microwave Station
Indian Trail Can
Smith Ridge
Rocky Flat
Three Cabin Ridge
Hamilton Canyon
Mahogany Mtn Airstrip Beacon
Strober Ranch
Grande Valley
Hilgard
Perry
Island City
La Grande
Table Mtn
Deal Canyon
Wilson Canyon
Coyote Canyon
Peach Canyon
Hilgard State Park
Lower Grande Ronde
Mulholland Slough
McAllister Slough
Whiskey
Jordan
Hunter Lakes

HELLHOLE R.A.

NO. 6261

ACRES 513

4/85 L.D.H.

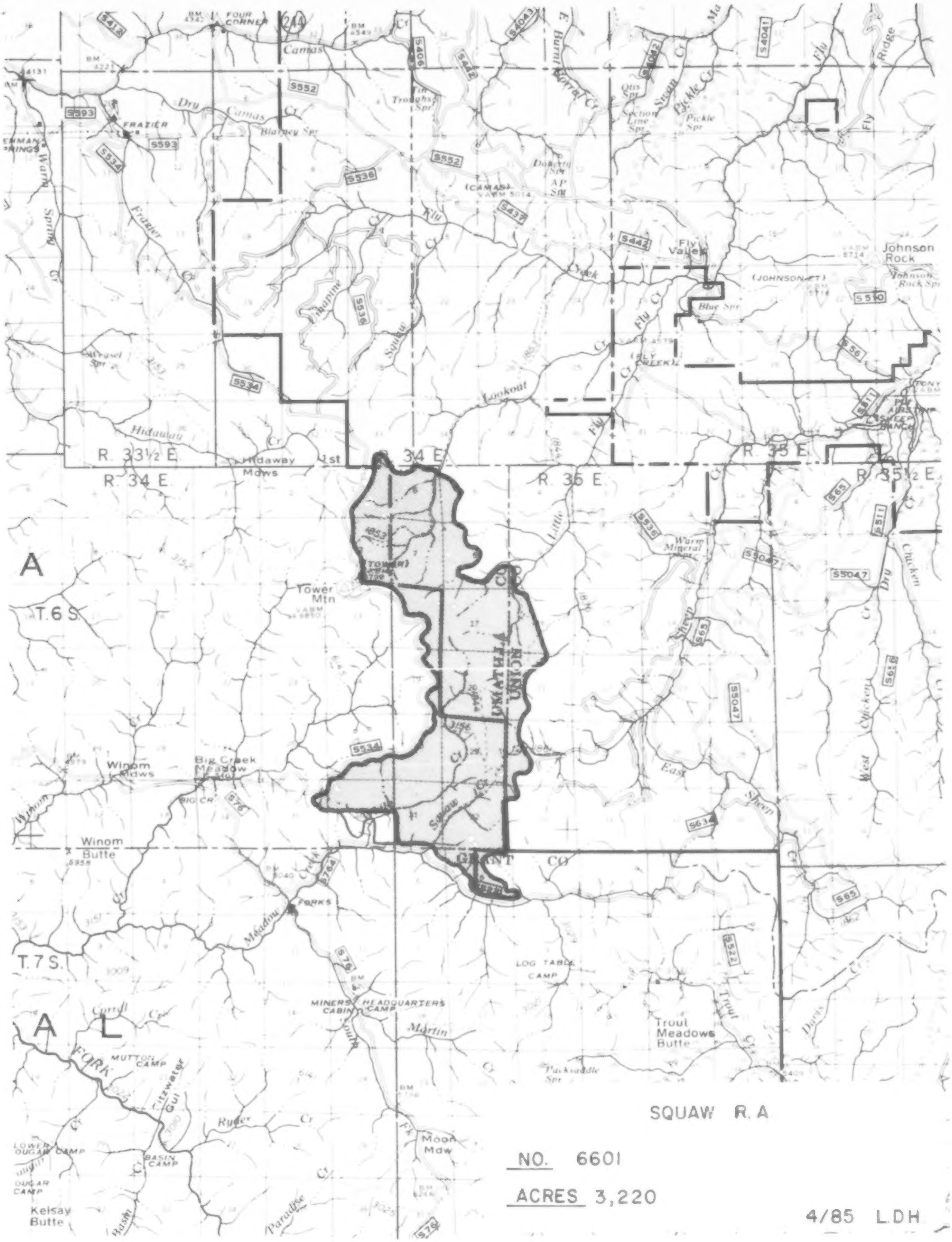

R. 37 E.
R. 38 E.
T1S
The Knob
Wilbur Mtn
Gray Rock
Pfefferkorn Canyon
Lewis
Fir Cr
Coon Cr
Coon Can
Green Mtn
Burnt Can
Herron Ridge
Indian Rock
Bull Can
PLEASANT GROVE GRANGE
(WEST RANCH)
Spring Mtn
Standfield Mdw
Telephone Ridge
Long Ridge
Horse Ridge
Drumhill
GRANDVIEW SPR
Indian Trail Can
Mt Emily
(RADIO MICROWAVE STATION)
Sugarloaf Mtn
Fox Prairie
Owsley Hogback
Kunamaker Pond
Smith Ridge
Walker Ridge
Three Cabin Ridge
Rocky Flat
Hamilton Canyon
MAHOGANY MTN AIRSTRIP BEACON
Dixie Flat
Bear Can
STROBER RANCH
(VALLEY)
GRANDE
VALL
(IMBLER
Hilgard
Perry
RONDE
HILGARD JCT STATE PARK
Coyote Canyon
Peach Canyon
Wilson Canyon
La Grande
Deal Canyon
Table Mtn
Island City
RIVER
McAllister Slough
Mulholland Slough
Crooked Cr
244
Whiskey
Jordan
Little
(COWBOY RIDGE)
Hunter Lake
M T N S
U E

N. MT. EMILY R. A.

NO. 6262

ACRES 772

4/85 L.D.H.

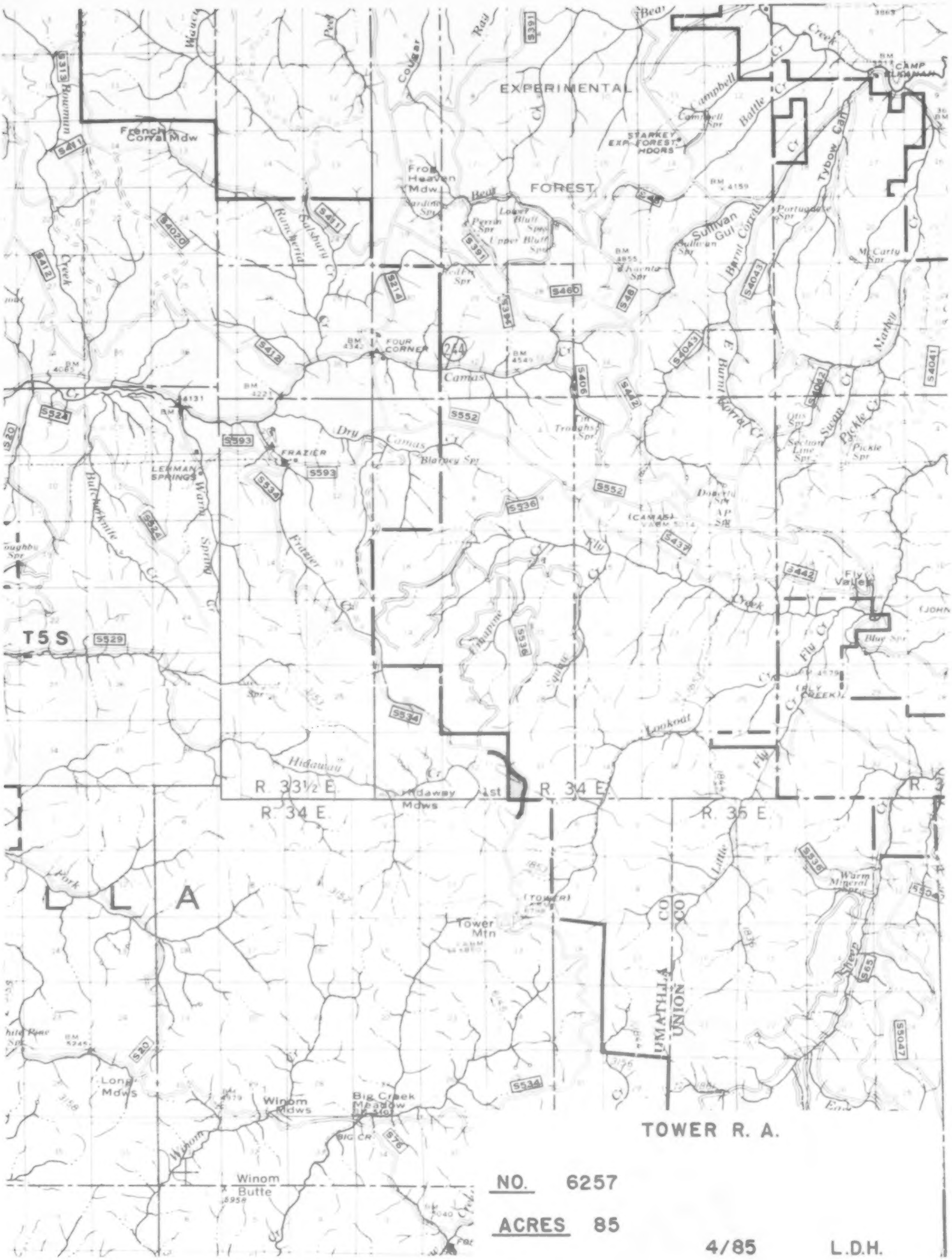

FOUR CORNER
Camas
Dry Camas Cr
FRAZIER
Fly Cr
Fly Valley
Johnson Rock
Blue Spr
Lookout Cr
Hidaway Cr
Hidaway Mdws
R. 33½ E.
R. 34 E.
R. 35 E.
R. 35½ E.
T.6 S.
T.7 S.
Tower Mtn
UMATILLA
UNION
GRANT CO
Winom Mdws
Big Creek Meadow
Winom Butte
FORKS
Meadow Creek
MINERS CABIN
HEADQUARTERS CAMP
Martin
LOG TABLE CAMP
Trout Meadows Butte
Packsaddle Spr
MUTTON CAMP
Fitzwater Gul
Ruger Cr
Moon Mdw
BASIN CAMP
COUGAR CAMP
Kelsay Butte
Paradise
Squaw Cr
Sheep Cr
Chicken Cr
Warm Mineral Spr

SQUAW R.A

NO. 6601

ACRES 3,220

4/85 LDH


EXPERIMENTAL
FOREST
French Corral Mdw
Frog Heaven Mdw
STARKEY EXP. FOREST HDQRS
CAMP ELKANAH
Campbell Spr
Sullivan Gul
Portuguese Spr
McCarty Spr
FOUR CORNER
Camas
Dry Camas Cr
FRAZIER
LEHMAN SPRINGS
Blarney Spr
(CAMAS)
Fly Valley
Blue Spr
Lookout
Hidaway Cr
Hidaway Mdws
T5S
R. 33½ E.
R. 34 E.
R. 34 E.
R. 35 E.
L
A
(TOWER)
Tower Mtn
UMATILLA CO
UNION CO
Warm Mineral Spr
Long Mdws
Winom Mdws
Big Creek Meadow
Winom Butte
244

TOWER R. A.

NO. 6257

ACRES 85

4/85 L.D.H.

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Effects of Alternatives on Roadless Areas

The primary consequences of alternatives on roadless areas results from those instances where the area is allocated to uses which call for construction of roads, timber harvest or other uses which alter the character of the area. Such activities would eliminate areas from future wilderness consideration, provided the development were to occur prior to developing the next Forest Land and Resource Management Plan.

Management Strategies 1, 2, and 3 will have the greater effects on roadless areas since they include timber harvest and usually road construction. Therefore, by reviewing Table C-3, the reader can envision which areas are likely to be altered. Alternative E allocates nearly all areas to Management Strategy 6, and will virtually ensure that the potential of the area for wilderness is retained. Conversely, Alternative B allocates extensive roadless areas to the timber management strategies. Other alternatives provide varying amounts between the range from B to E. But even with the most commodity oriented alternatives (Alternative B and B-dep.) 26 percent of the roadless acres outside the HCNRA will remain undeveloped because they are not suitable for commodity uses which require development. As shown in Table C-3, significant roadless area acreages are retained in all alternatives.

Table C-6 shows the management strategy by roadless area by alternative. From the point of view of many, those alternatives which retain the roadless character of an area is desirable. To others, however, road access means being able to drive into and use areas that have heretofore been inaccessible to them. It also means access for mineral exploration. For those who believe there is sufficient wilderness, potential wilderness values being foregone is not a serious adverse consequence of roadless area development.

Effects of Roadless Areas on Other Resources

Table IV-4 in Chapter IV illustrates the amount of timber production foregone as a result of Management Strategy 6, the dominant strategy that reserves roadless area character. Some roadless areas will not actually be harvested for several decades, due to expensive access and low value timber species. Therefore, the area may not actually be scheduled for timber harvest before a new Forest Plan is completed. However, as a part of the total timber inventory the area contributes toward the calculated first decade harvest level in those alternatives where they are allocated to strategies which provide for timber management. See Table C-7 which shows the potential annual timber volume by roadless area by alternatives.

Because undeveloped areas often have an abundance of overmature timber, susceptible to insects and disease, the roadless areas provide a source of infection that may spread to adjacent stands.

AVAILABLE

Maintaining the roadless areas has much less effect on other renewable resources than on timber. Utilization of other resources usually does not require roading. Roading may make livestock management more convenient, but this advantage may be offset by increased costs for structural improvements such as cattleguards or fences and the inconvenience of nonuse periods while new trees are becoming established in plantations.

Keeping the roadless areas in an undeveloped state results in maintaining high dead and down tree wildlife habitat. The option of using timber harvest for improving habitat is foregone but since the use of fire is permitted, habitat manipulation is still possible.

Since the semiprimitive motorized and semiprimitive nonmotorized are the recreation opportunity spectrum classes in shortest supply, maintaining the roadless areas will serve to retain the recreation experiences offered by these classes in proportion to the amount of area retained. Table C-8 shows the recreation opportunity spectrum by roadless area by alternative.

Mineral exploration is less easily accomplished in roadless areas. The effects of maintaining undeveloped areas on watershed values are more positive than negative since roads are an important cause of sediment.

Table C-9 illustrates the proposed roading of the roadless areas, by alternative, over the next 30 years.

Table C-6
ROADLESS AREA DESIGNATION BY MANAGEMENT STRATEGY
(Acres by Alternative)

	A	B&Bd	C,Cd&H	D	E	F	G
Boulder Park 282 Acres:12311							
Management Strategy 1		9,453	881	5,861			9,453
Management Strategy 2		104					104
management Strategy 3			4,980				
Management Strategy 4							
Management Strategy 6		1,906	5,836	5,836	12,311	12,106	1,906
Management Strategy 7						207	
Management Strategy 12							
Management Strategy 15		848	614	614			848
Optimum Wood Big Game Mgt	1,547						
Low Investment Timber Mgt	304						
Dispersed Recreation Mgt	10,460						
Castle Ridge 278 Acres:12001							
Management Strategy 1		7,348	3,843	3,843			7,348
Management Strategy 2		3,412					3,412
Management Strategy 3			3,186	3,186			
Management Strategy 4							
Management Strstegy 6			3,241	3,241	11,134		
Management Strategy 7							
Management Strategy 12	867	867	867	867	867	867	867
Management Strategy 15		374	864	864			374
Management Strategy 18						11,134	
Optimum Wood Big Game Mgt	4,947						
Low Investment Timber Mgt	248						
Dispersed Recreation Mgt	5,939						
Deadhorse G08 Acres:10451							
Management Strategy 1							
Management Strategy 2		10,451					10,451
Management Strategy 3			10,399	10,399			
Management Strategy 4							
Management Strategy 6					10,451		
Management Strategy 7							
Management Strategy 12							
Management Strategy 15			52	52			
Management Strategy 18						10,451	
Low Investment Timber Mgt	10,451						
Dunns Bluff WW1 Acres:1013							
Management Strategy 1		1,013	47	47			1,013
Management Strategy 2							
Management Strategy 3							
Management Strategy 4					1,013	1,103	
Management Strategy 6			966	966			
Management Strategy 7							
Management Strategy 12							
Management Strategy 15							
Low Investment Timber Mgt	708						
Dispersed Recreation Mgt	305						

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Table C-6 (cont.)
ROADLESS AREA DESIGNATION BY MANAGEMENT STRATEGY
IV. ECONOMIC EFFICIENCY ANALYSIS (2)
(Acres by Alternative)

	A	B&Bd	C,Cd&H	D	E	F	G
Grande Ronde 267 Acres:4890							
Management Strategy 1		57					57
Management Strategy 2		4,833					4,833
Management Strategy 3							
Management Strategy 4							
Management Strategy 6			3,026	3,026	3,026	3,026	
Management Strategy 7			1,864	1,864	1,864	1,864	
Management Strategy 12							
Management Strategy 15							
Dispersed Recreation Mgt	4,890						
Greenhorn 252 Acres:161							
Management Strategy 1		161	161	161		161	161
Management Strategy 2							
Management Strategy 3							
Management Strategy 4							
Management Strategy 6					161		
Management Strategy 7							
Management Strategy 12							
Management Strategy 15							
Dispersed Recreation Mgt	161						
Hellhole 261 Acres:513							
Management Strategy 1		513		513			513
Management Strategy 2							
Management Strategy 3			513				
Management Strategy 4							
Management Strategy 6					513		
Management Strategy 7							
Management Strategy 12							
Management Strategy 15							
Management Strategy 18						513	
Optimum Wood Big Game Mgt	513						
Huckleberry 289 Acres:10707							
Management Strategy 1		9,366	1,638	7,365			9,366
Management Strategy 2		1,341					1,341
Management Strategy 3			6,661	934		10,707	
Management Strategy 4							
Management Strategy 6			1,951	1,951	10,707		
Management Strategy 7							
Management Strategy 12							
Management Strategy 15			457	457			
Intensive Wood Forage Mgt	87						
Dispersed Recreation Mgt	2,186						
Old Growth Mgt	4,823						
Low Investment Timber Mgt	3,611						

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Table C-6 (cont.)

ROADLESS AREA DESIGNATION BY MANAGEMENT STRATEGY

(Acres by Alternative)

	A	B&Bd	C,Cd&H	D	E	F	G
Hurricane Creek 288 Acres:1623							
Management Strategy 1		1,623	119	119			1,623
Management Strategy 2							
Management Strategy 3							
Management Strategy 4							
Management Strategy 6			1,504	1,504	1,623	1,623	
Management Strategy 7							
Management Strategy 12							
Management Strategy 15							
Dispersed Recreation Mgt	1,623						
Joseph Canyon G04 Acres:23602							
Management Strategy 1		2,177	1,777	1,777			2,177
Management Strategy 2		21,425					21,425
Management Strategy 3			19,516	19,516			
Management Strategy 4							
Management Strategy 6					23,602		
Management Strategy 7						2,159	
Management Strategy 12							
Management Strategy 15			2,309	2,309		3,174	
Management Strategy 18						18,269	
Old Growth Mgt	769						
Low Investment Timber Mgt	22,833						
Little Creek 280 Acres:2907							
Management Strategy 1		1,416	1,416	1,416			1,416
Management Strategy 2		1,491					1,491
Management Strategy 3			1,491	1,491			
Management Strategy 4							
Management Strategy 6					2,907	2,907	
Management Strategy 7							
Management Strategy 12							
Management Strategy 15							
Optimum Wood Big Game Mgt	2,277						
Old Growth Mgt	630						
Little Eagle Meadows 283 Acres:7140							
Management Strategy 1		5,156	875	3,860			5,156
Management Strategy 2							
Management Strategy 3			2,985				
Management Strategy 4							
Management Strategy 6		1,561	2,792	2,792	7,140	7,140	1,561
Management Strategy 7							
Management Strategy 12							
Management Strategy 15		423	488	488			423
Intensive Wood Forage Mgt	369						
Optimum Wood Big Game Mgt	494						
Dispersed Recreation Mgt	6,277						

Table C-6 (cont.)
ROADLESS AREA DESIGNATION BY MANAGEMENT STRATEGY
(Acres by Alternative)

	A	B&Bd	C,Cd&H	D	E	F	G
Little Sheep 286 Acres:5278							
Management Strategy 1		5,278	540	540			5,278
Management Strategy 2							
Management Strategy 3							
Management Strategy 4							
Management Strategy 6			4,738	4,738	5,278	5,278	
Management Strategy 7							
Management Strategy 12							
Management Strategy 15							
Intensive Wood Forage Mgt	2,118						
Dispersed Recreation Mgt	2,124						
Old Growth Mgt	1,036						
Marble Point 271 Acres:7135							
Management Strategy 1		4,985	299	4,669			4,985
Management Strategy 2							
Management Strategy 3			4,307			4,725	
Management Strategy 4							
Management Strategy 6		2,150	2,297	2,297	7,135	2,141	2,150
Management Strategy 7							
Management Strategy 12							
Management Strategy 15			232	169		269	
Intensive Wood Forage Mgt	299						
Optimum Wood Big Game Mgt	217						
Baker City Watershed	6,619						
Monument Rock 240 Acres:5958							
Management Strategy 1		5,577	3,781	5,482			5,577
Management Strategy 2							
Management Strategy 3						3,554	
Management Strategy 4							
Management Strategy 6			2,097		5,958	2,125	
Management Strategy 7							
Management Strategy 12							
Management Strategy 15		381	80	476		279	381
Intensive Wood Forage Mgt	2,075						
Optimum Wood Big Game Mgt	3,883						
Mount Emily 277 Acres:12022							
Management Strategy 1		11,739	687	11,541			11,739
Management Strategy 2		283					283
Management Strategy 3			11,161	283			
Management Strategy 4							
Management Strategy 6					12,022		
Management Strategy 7							
Management Strategy 12							
Management Strategy 15			174	198			
Management Strategy 18						12,022	
Optimum Wood Big Game Mgt	3,879						
Dispersed Recreation Mgt	8,143						

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Table C-6 (cont.)
ROADLESS AREA DESIGNATION BY MANAGEMENT STRATEGY
(Acres by Alternative)

	A	B&Bd	C,Cd&H	D	E	F	G
North Mount Emily 262 Acres:772							
Management Strategy 1		417		417			417
Management Strategy 2		355					355
Management Strategy 3			772	355			
Management Strategy 4							
Management Strategy 6					772		
Management Strategy 7							
Management Strategy 12							
Management Strategy 15							
Management Strategy 18						772	
Optimum Wood Big Game Mgt	772						
Reservoir 284 Acres:13595							
Management Strategy 1		6,457		1,502			6,457
Management Strategy 2							
Management Strategy 3			1,502				
Management Strategy 4							
Management Strategy 6		6,462	11,743	11,743	13,595	13,595	6,462
Management Strategy 7							
Management Strategy 12							
Management Strategy 15		676	350	350			676
Intensive Wood Forage Mgt	593						
Optimum Wood Big Game Mgt	386						
Dispersed Recreation Mgt	12,616						
Squaw 601 Acres:3220							
Management Strategy 1		2,860	2,860	2,860			2,860
Management Strategy 2							
Management Strategy 6					3,220		
Management Strategy 15		360	360	360		360	360
Management Strategy 18						2,860	
Optimum Wood Big Game Mgt	130						
Low Investment Timber Mgt	1,829						
Intensive Wood Forage Mgt	576						
Old-Growtg Mgt	685						
Tope Creek G03 Acres:8674							
Management Strategy 1		942	942	942			942
Management Strategy 2		7,732	7,241				7,732
Management Strategy 3				7,241			
Management Strategy 4							
Management Strategy 6					8,674		
Management Strategy 7							
Management Strategy 12							
Management Strategy 15			491	491		723	
Management Strategy 18						7,951	
Old Growth Mgt	1,086						
Low Investment Timber Mgt	7,588						

Table C-6 (cont.)
ROADLESS AREA DESIGNATION BY MANAGEMENT STRATEGY
(Acres by Alternative)

	A	B&Bd	C,Cd&H	D	E	F	G
Tower 257 Acres:85							
Management Strategy 1		85	85	85			85
Management Strategy 2							
Management Strategy 3						85	
Management Strategy 4							
Management Strategy 6					85		
Management Strategy 7							
Management Strategy 12							
Management Strategy 15							
Intensive Wood Forage Mgt	85						
Twin Mountain 273 Acres:60903							
Management Strategy 1		20,095	5,555	11,912			20,095
Management Strategy 2							
Management Strategy 3			2,663			8,418	
Management Strategy 4							
Management Strategy 6		39,259	47,916	46,534	58,892	46,094	39,259
Management Strategy 7			91	91	2,011	1,920	
Management Strategy 12							
Management Strategy 15		1,549	2,329	2,366		2,321	1,549
Management Strategy 18			2,349			2,150	
Intensive Wood Forage Mgt	10,361						
Optimum Wood Big Game Mgt	2,431						
Low Investment Timber Mgt	1,533						
Dispersed Recreation Mgt	44,457						
Baker City Watershed	2,121						
Upper Catherine Creek 281 Acres:6844							
Management Strategy 1		6,636	4,576	4,576			6,636
Management Strategy 2							
Management Strategy 3							
Management Strategy 4							
Management Strategy 6			2,071	2,071	6,844	6,844	
Management Strategy 7							
Management Strategy 12							
Management Strategy 15		208	197	197			208
Optimum Wood Big Game Mgt	2,017						
Low Investment Timber Mgt	4,706						
Dispersed Recreation Mgt	121						

Table C-6 (cont.)
ROADLESS AREA DESIGNATION BY MANAGEMENT STRATEGY
(Acres by Alternative)

	A	B&Bd	C,Cd&H	D	E	F	G
Homestead 291 Acres:5733							
Management Strategy 1		(1879)	(1879)	(1879)	(1879)		(1879)
Management Strategy 2		(528)			(528)		(528)
Management Strategy 3			(528)	(528)		(2407)	
Management Strategy 4							
Management Strategy 6							
Management Strategy 7							
Management Strategy 10	(3326)	(3326)	(3326)	(3326)	(3326)	(3326)	(3326)
Management Strategy 12							
Management Strategy 13	5,733	5,733	5,733	5,733	5,733	5,733	5,733
Management Strategy 15							
Optimum Wood Big Game Mgt	(2407)						
Lake Fork 290 Acres:14898							
Management Strategy 1		13,901		13,764			
Management Strategy 2							
Management Strategy 3			13,764				
Management Strategy 4							
Management Strategy 6					14,898	14,898	14,898
Management Strategy 7							
Management Strategy 12							
Management Strategy 15		997	1,134	1,134			
Intensive Wood Forage Mgt	14,153						
Optimum Wood Big Game Mgt	695						
Dispersed Recreation Mgt	50						

Figures in parenthesis indicate what the land allocation would be if the alternative is selected.

Table C-7
POTENTIAL ANNUAL TIMBER HARVEST
(MMBF BY ALTERNATIVE)

Date 08/21/85

Roadless Area Name	RARE#	A	B&B-dep	C,C-dep&H	DX	E	F	G
Boulder Park	282	.076	.566	.289	.348	0.000	0.000	.566
Castle Ridge	278	.360	1.044	.643	.643	0.000	.892	1.044
Deadhorse	G08	.093	.129	.114	.114	0.000	.144	.129
Dunns Bluff	WW1	.032	.070	0.000	0.000	0.000	0.000	.070
Grande Ronde 1/	267	0.000	.216	0.000	0.000	0.000	0.000	.216
Greenhorn 1/	252	0.000	.023	.023	.023	0.000	.023	.023
Bellhole 1/	261	.071	.071	.057	.071	0.000	.057	.071
Homestead	291	0.000	.042	.041	.041	0.000	.034	.042
Huckleberry	289	.406	.836	.556	.645	0.000	.678	.836
Hurricane Creek	288	0.000	.142	.010	.010	0.000	0.000	.142
Joseph Canyon	G04	.501	.704	.570	.570	0.000	.484	.704
Lake Fork	290	1.772	1.673	1.324	1.655	0.000	0.000	0.000
Little Creek	280	.155	.220	.208	.208	0.000	0.000	.220
Little Eagle Meadows	283	.053	.382	.242	.287	0.000	0.000	.382
Little Sheep	286	.265	.520	.052	.052	0.000	0.000	.520
Marble Point	271	.524	.515	.389	.482	0.000	.389	.515
Monument Rock	240	.255	.298	.203	.292	0.000	.152	.298
Mount Emily	277	.295	1.316	1.060	1.287	0.000	1.055	1.316
North Mount Emily 1/	262	.060	.082	.069	.078	0.000	.069	.082
Reservoir	284	.049	.379	.071	.089	0.000	0.000	.379
Squaw 1/	601	.215	.276	.276	.276	0.000	.221	.276
Tope Creek	G03	.106	.151	.142	.128	0.000	.122	.151
Tower 1/	256	.008	.008	.008	.008	0.000	.006	.008
Twin Mountain	273	.803	1.108	.517	.672	0.000	.457	1.108
Upper Catherine Creek	281	.424	.625	.431	.431	0.000	0.000	.625
TOTAL		6.523	11.396	7.295	8.410	0.000	4.753	9.723
1/ Shared with Umatilla NF		.354	.676	.433	.456	0.000	.376	.676

Table C-8
RECREATION OPPORTUNITY SPECTRUM BY ROADLESS AREA*
(Alternative A)

DATE 06/17/85 ROADLESS AREA NAME	RARE#	RURAL	ROAD M	ACRES SPM	SPNM	PRIM	TOTALS
Boulder Park	282	0	5851	4580	1880	0	12311
Castle Ridge	278	0	7111	4890	0	0	12001
Deadhorse	G08	0	244	4090	6117	0	10451
Dunns Bluff	WW1	0	1013	0	0	0	1013
Grande Ronde	267	0	0	0	4890	0	4890
Greenhorn	252	0	161	0	0	0	161
Hellhole	261	0	513	0	0	0	513
Homestead	291	0	3503	0	2230	0	5733
Huckleberry	289	0	10707	0	0	0	10707
Hurricane Creek	288	0	0	376	1247	0	1623
Joseph Canyon	G04	0	23602	0	0	0	23602
Lake Fork	290	0	14898	0	0	0	14898
Little Creek	280	0	2907	0	0	0	2907
Little Eagle Meadows	283	0	4220	1370	1550	0	7140
Little Sheep	286	62	3742	0	1474	0	5278
Marble Point	271	0	7135	0	0	0	7135
Monument Rock	240	0	5958	0	0	0	5958
Mount Emily	277	0	7042	4980	0	0	12022
North Mount Emily	262	0	772	0	0	0	772
Reservoir	284	0	1840	11755	0	0	13595
Squaw	601	0	3220	0	0	0	3220
Tope Creek	G03	0	8674	0	0	0	8674
Tower	256	0	85	0	0	0	85
Twin Mountain	273	0	28323	18790	13790	0	60903
Upper Catherine Creek	281	0	6844	0	0	0	6844
TOTAL		62	148365	50831	33178	0	232436

*Road M: Roaded Modified
SPM: Semiprimitive Motorized
SPNM: Semiprimitive Nonmotorized
PRIM: Primitive
(See glossary for definition of terms)

Table C-8 (cont)
RECREATION OPPORTUNITY SPECTRUM BY ROADLESS AREA*
(Alternatives B & B-dep)

DATE 06/17/85

				ACRES			
ROADLESS AREA NAME	RARE#	RURAL	ROAD M	SPM	SPNM	PRIM	TOTALS
Boulder Park	282	0	12311	0	0	0	12311
Castle Ridge	278	0	12001	0	0	0	12001
Deadhorse	G08	0	244	4090	6117	0	10451
Dunns Bluff	WW1	0	1013	0	0	0	1013
Grande Ronde	267	0	4890	0	0	0	4890
Greenhorn	252	0	161	0	0	0	161
Hellhole	261	0	513	0	0	0	513
Homestead	291	0	3503	0	2230	0	5733
Huckleberry	289	0	10707	0	0	0	10707
Hurricane Creek	288	0	1623	0	0	0	1623
Joseph Canyon	G04	0	23602	0	0	0	23602
Lake Fork	290	0	14898	0	0	0	14898
Little Creek	280	0	2907	0	0	0	2907
Little Eagle Meadows	283	0	6680	460	0	0	7140
Little Sheep	286	62	5216	0	0	0	5278
Marble Point	271	0	7135	0	0	0	7135
Monument Rock	240	0	5958	0	0	0	5958
Mount Emily	277	0	12022	0	0	0	12022
North Mount Emily	262	0	772	0	0	0	772
Reservoir	284	0	11305	2290	0	0	13595
Squaw	601	0	3220	0	0	0	3220
Tope Creek	G03	0	8674	0	0	0	8674
Tower	256	0	85	0	0	0	85
Twin Mountain	273	0	49103	5170	6630	0	60903
Upper Catherine Creek	281	0	6844	0	0	0	6844
TOTAL		62	205387	12010	14977	0	232436

*Road M: Roaded Modified
SPM: Semiprimitive Motorized
SPNM: Semiprimitive Nonmotorized
PRIM: Primitive
(See glossary for definition of terms)

Table C-8 (cont)
RECREATION OPPORTUNITY SPECTRUM BY ROADLESS AREA*
(Alternatives C,C-dep & H)

DATE 06/17/85 ROADLESS AREA NAME	RARE#	ACRES RURAL	 ROAD M	 SPM	 SPNM	 PRIM	 TOTALS
Boulder Park	282	0	10911	470	930	0	12311
Castle Ridge	278	0	9936	2065	0	0	12001
Deadhorse	G08	0	244	4090	6117	0	10451
Dunns Bluff	WW1	0	0	1013	0	0	1013
Grande Ronde	267	0	0	0	4890	0	4890
Greenhorn	252	0	161	0	0	0	161
Hellhole	261	0	513	0	0	0	513
Homestead	291	0	3503	0	2230	0	5733
Huckleberry	289	0	10707	0	0	0	10707
Hurricane Creek	288	0	240	376	1007	0	1623
Joseph Canyon	G04	0	23602	0	0	0	23602
Lake Fork	290	0	14898	0	0	0	14898
Little Creek	280	0	2907	0	0	0	2907
Little Eagle Meadows	283	0	5740	1400	0	0	7140
Little Sheep	286	62	1388	0	3828	0	5278
Marble Point	271	0	7135	0	0	0	7135
Monument Rock	240	0	5418	540	0	0	5958
Mount Emily	277	0	12022	0	0	0	12022
North Mount Emily	262	0	772	0	0	0	772
Reservoir	284	0	2550	11045	0	0	13595
Squaw	601	0	3220	0	0	0	3220
Tope Creek	G03	0	8674	0	0	0	8674
Tower	256	0	85	0	0	0	85
Twin Mountain	273	0	28623	19580	12700	0	60903
Upper Catherine Creek	281	0	5689	815	340	0	6844
TOTAL		62	158938	41394	32042	0	232436

*Road M: Roaded Modified
SPM: Semiprimitive Motorized
SPNM: Semiprimitive Nonmotorized
PRIM: Primitive
(See glossary for definition of terms)

Table C-8 (cont)
RECREATION OPPORTUNITY SPECTRUM BY ROADLESS AREA*
(Alternative D)

DATE 06/17/85				ACRES			
ROADLESS AREA NAME	RARE#	RURAL	ROAD M	SPM	SPNM	PRIM	TOTALS
Boulder Park	282	0	10911	470	930	0	12311
Castle Ridge	278	0	9936	2065	0	0	12001
Deadhorse	G08	0	244	4090	6117	0	10451
Dunns Bluff	WW1	0	0	1013	0	0	1013
Grande Ronde	267	0	0	0	4890	0	4890
Greenhorn	252	0	161	0	0	0	161
Hellhole	261	0	513	0	0	0	513
Homestead	291	0	3503	0	2230	0	5733
Huckleberry	289	0	10707	0	0	0	10707
Hurricane Creek	288	0	240	376	1007	0	1623
Joseph Canyon	G04	0	23602	0	0	0	23602
Lake Fork	290	0	14898	0	0	0	14898
Little Creek	280	0	2907	0	0	0	2907
Little Eagle Meadows	283	0	5740	1400	0	0	7140
Little Sheep	286	62	1388	0	3828	0	5278
Marble Point	271	0	7135	0	0	0	7135
Monument Rock	240	0	5958	0	0	0	5958
Mount Emily	277	0	12022	0	0	0	12022
North Mount Emily	262	0	772	0	0	0	772
Reservoir	284	0	2550	11045	0	0	13595
Squaw	601	0	3220	0	0	0	3220
Tope Creek	G03	0	8674	0	0	0	8674
Tower	256	0	85	0	0	0	85
Twin Mountain	273	0	28623	19580	12700	0	60903
Upper Catherine Creek	281	0	5689	815	340	0	6844
TOTAL		62	159478	40854	32042	0	232436

*Road M: Roaded Modified
SPM: Semiprimitive Motorized
SPNM: Semiprimitive Nonmotorized
PRIM: Primitive
(See glossary for definition of terms)

Table C-8 (cont)
RECREATION OPPORTUNITY SPECTRUM BY ROADLESS AREA 1/
(Alternative E)

DATE 06/17/85

		ACRES						
ROADLESS AREA NAME	RARE#	RURAL	ROAD M	SPM	SPNM	PRIM	SP*	TOTALS
Boulder Park	282	0	3422	5699	3190	0	0	12311
Castle Ridge	278	0	1182	10819	0	0	0	12001
Deadhorse	G08	0	244	4090	6117	0	0	10451
Dunns Bluff	WW1	0	0	0	0	0	1013	1013
Grande Ronde	267	0	0	0	4890	0	0	4890
Greenhorn	252	0	161	0	0	0	0	161
Hellhole	261	0	513	0	0	0	0	513
Homestead	291	0	3503	0	2230	0	0	5733
Huckleberry	289	0	2455	1690	6562	0	0	10707
Hurricane Creek	288	0	0	376	1247	0	0	1623
Joseph Canyon	G04	0	1606	12597	9399	0	0	23602
Lake Fork	290	0	1830	13068	0	0	0	14898
Little Creek	280	0	1115	160	1632	0	0	2907
Little Eagle Meadows	283	0	1450	3530	2160	0	0	7140
Little Sheep	286	62	578	0	4638	0	0	5278
Marble Point	271	0	1136	5999	0	0	0	7135
Monument Rock	240	0	1537	2003	2418	0	0	5958
Mount Emily	277	0	1625	10397	0	0	0	12022
North Mount Emily	262	0	772	0	0	0	0	772
Reservoir	284	0	167	13428	0	0	0	13595
Squaw	601	0	3220	0	0	0	0	3220
Tope Creek	G03	0	549	0	8125	0	0	8674
Tower	256	0	85	0	0	0	0	85
Twin Mountain	273	0	9157	30845	20901	0	0	60903
Upper Catherine Creek	281	0	2013	3681	1150	0	0	6844
TOTAL		62	38320	118382	74659	0	1013	232436

1/ Road M: Roaded Modified
SPM: Semiprimitive Motorized
SPNM: Semiprimitive Nonmotorized
PRIM: Primitive
(See glossary for definition of terms)

* *Wilderness (ROS) Semiprimitive

Table C-8 (cont)

RECREATION OPPORTUNITY SPECTRUM BY ROADLESS AREA 1/

(Alternative F)

DATE 06/17/85					ACRES			
ROADLESS AREA NAME	RARE#	RURAL	ROAD M	SPM	SPNM	PRIM	SP*	TOTALS
Boulder Park	282	0	3422	5699	3190	0	0	12311
Castle Ridge	278	0	1182	10819	0	0	0	12001
Deadhorse	G08	0	244	4090	6117	0	0	10451
Dunns Bluff	WW1	0	0	0	0	0	1013	1013
Grande Ronde	267	0	0	0	4890	0	0	4890
Greenhorn	252	0	161	0	0	0	0	161
Hellhole	261	0	513	0	0	0	0	513
Homestead	291	0	3503	0	2230	0	0	5733
Huckleberry	289	0	2455	1690	6562	0	0	10707
Hurricane Creek	288	0	0	376	1247	0	0	1623
Joseph Canyon	G04	0	23602	0	0	0	0	23602
Lake Fork	290	0	14898	0	0	0	0	14898
Little Creek	280	0	1115	160	1632	0	0	2907
Little Eagle Meadows	283	0	1450	3530	2160	0	0	7140
Little Sheep	286	62	578	0	4638	0	0	5278
Marble Point	271	0	7135	0	0	0	0	7135
Monument Rock	240	0	5418	540	0	0	0	5958
Mount Emily	277	0	1625	10397	0	0	0	12022
North Mount Emily	262	0	772	0	0	0	0	772
Reservoir	284	0	167	13428	0	0	0	13595
Squaw	601	0	3220	0	0	0	0	3220
Tope Creek	G03	0	8674	0	0	0	0	8674
Tower	256	0	85	0	0	0	0	85
Twin Mountain	273	0	28623	19580	12700	0	0	60903
Upper Catherine Creek	281	0	2013	3681	1150	0	0	6844
TOTAL		62	110855	73990	46516	0	1013	232436

1/ Road M: Roaded Modified
SPM: Semiprimitive Motorized
SPNM: Semiprimitive Nonmotorized
PRIM: Primitive
(See glossary for definition of terms)

* Wilderness (ROS) Semiprimitive

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Table C-8 (cont)
RECREATION OPPORTUNITY SPECTRUM BY ROADLESS AREA*
(Alternative G)

DATE 06/17/85

ROADLESS AREA NAME	RARE#	RURAL	ROAD M	SPM	SPNM	PRIM	TOTALS
		ACRES					
Boulder Park	282	0	12311	0	0	0	12311
Castle Ridge	278	0	12001	0	0	0	12001
Deadhorse	G08	0	244	4090	6117	0	10451
Dunns Bluff	WW1	0	1013	0	0	0	1013
Grande Ronde	267	0	4890	0	0	0	4890
Greenhorn	252	0	161	0	0	0	161
Hellhole	261	0	513	0	0	0	513
Homestead	291	0	3503	0	2230	0	5733
Huckleberry	289	0	10707	0	0	0	10707
Hurricane Creek	288	0	1623	0	0	0	1623
Joseph Canyon	G04	0	23602	0	0	0	23602
Lake Fork	290	0	1830	13068	0	0	14898
Little Creek	280	0	2907	0	0	0	2907
Little Eagle Meadows	283	0	6680	460	0	0	7140
Little Sheep	286	62	5216	0	0	0	5278
Marble Point	271	0	7135	0	0	0	7135
Monument Rock	240	0	5958	0	0	0	5958
Mount Emily	277	0	12022	0	0	0	12022
North Mount Emily	262	0	772	0	0	0	772
Reservoir	284	0	11305	2290	0	0	13595
Squaw	601	0	3220	0	0	0	3220
Tope Creek	G03	0	8674	0	0	0	8674
Tower	256	0	85	0	0	0	85
Twin Mountain	273	0	49103	5170	6630	0	60903
Upper Catherine Creek	281	0	6844	0	0	0	6844
TOTAL		62	192319	25078	14977	0	232436

*Road M: Roaded Modified
SPM: Semiprimitive Motorized
SPNM: Semiprimitive Nonmotorized
PRIM: Primitive
(See glossary for definition of terms)

Table C-9
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVE A
DECADE ONE

Date 08/20/85 Roadless Area Name	RARE#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	2.4	9.2	19.0	30.6
Castle Ridge	278	3.6	0.0	0.0	17.0	8.0	28.6
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	0.0	0.0	0.0	0.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	0.0	0.0
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	3.4	13.7	11.0	28.1
Hurricane Creek	288	0.0	0.0	0.0	0.0	0.0	0.0
Joseph Canyon	G04	0.0	0.0	5.7	19.3	10.0	35.0
Lake Fork	290	0.0	2.2	6.6	37.4	24.0	70.2
Little Creek	280	0.0	0.0	0.0	0.0	0.0	0.0
Little Eagle Meadows	283	0.0	0.0	0.0	.4	2.0	2.4
Little Sheep	286	0.0	0.0	0.0	0.0	0.0	0.0
Marble Point	271	0.0	0.0	0.0	12.8	9.5	22.3
Monument Rock	240	0.0	0.0	0.0	22.3	4.0	26.3
Mount Emily	277	3.4	0.0	0.0	26.2	8.0	37.6
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir	284	0.0	0.0	0.0	0.0	0.0	0.0
Squaw 1/	601	0.0	0.0	0.0	21.7	4.0	25.7
Tope Creek	G03	0.0	0.0	0.0	0.0	0.0	0.0
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	0.0
Twin Mountain	273	5.3	4.3	8.2	46.4	30.0	94.2
Upper Catherine Creek	281	0.0	0.0	5.0	18.6	8.5	32.1
TOTAL		12.3	6.5	31.3	245.0	138.0	433.1
1/ Shared with Umatilla NF		0.0	0.0	0.0	21.7	4.0	25.7

Table C-9 (cont.)
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVE A
DECADE TWO

Date 08/21/85 Roadless Area Name	RARE#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	1.2	4.6	19.0	24.8
Castle Ridge	278	0.0	0.0	0.0	0.0	8.0	8.0
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	0.0	0.0	0.0	0.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	0.0	0.0
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	6.8	27.3	11.0	45.1
Hurricane Creek	288	0.0	0.0	0.0	0.0	0.0	0.0
Joseph Canyon	G04	0.0	0.0	0.0	0.0	10.0	10.0
Lake Fork	290	0.0	1.1	3.3	18.7	24.0	47.1
Little Creek	280	0.0	0.0	.5	9.3	3.0	12.8
Little Eagle Meadows	283	0.0	0.0	0.0	.2	2.0	2.2
Little Sheep	286	0.0	0.0	0.0	0.0	0.0	0.0
Marble Point	271	0.0	0.0	0.0	6.4	9.5	15.9
Monument Rock	240	0.0	0.0	0.0	10.1	4.0	14.1
Mount Emily	277	0.0	0.0	0.0	0.0	8.0	8.0
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir	284	0.0	0.0	3.0	5.5	2.0	10.5
Squaw 1/	601	0.0	0.0	0.0	10.8	4.0	14.8
Tope Creek	G03	0.0	0.0	0.0	0.0	0.0	0.0
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	0.0
Twin Mountain	273	5.3	4.3	8.2	46.4	30.0	94.2
Upper Catherine Creek	281	0.0	0.0	5.0	18.6	8.5	32.1
TOTAL		5.3	5.4	28.0	158.0	143.0	339.7
1/ Shared with Umatilla NF		0.0	0.0	0.0	10.8	4.0	14.8

Table C-9 (cont.)
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVE A
DECADE THREE

Date 08/21/85 Roadless Area Name	Rare#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	0.0	0.0	19.0	19.0
Castle Ridge	278	0.0	0.0	0.0	0.0	8.0	8.0
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	0.0	0.0	0.0	0.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	0.0	0.0
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	0.0	0.0	0.0	0.0
Hurricane Creek	288	0.0	0.0	0.0	0.0	11.0	11.0
Joseph Canyon	G04	0.0	0.0	0.0	0.0	0.0	0.0
Lake Fork	290	0.0	0.0	0.0	0.0	10.0	10.0
Little Creek	280	0.0	0.0	0.0	0.0	24.0	24.0
Little Eagle Meadows	283	0.0	0.0	0.0	4.7	3.0	7.7
Little Sheep	286	0.0	0.0	0.0	0.0	2.0	2.0
Marble Point	271	0.0	0.0	1.0	20.2	5.0	26.2
Monument Rock	240	0.0	0.0	0.0	0.0	9.5	9.5
Mount Emily	277	0.0	0.0	0.0	0.0	4.0	4.0
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	8.0	8.0
Reservoir	284	0.0	0.0	0.0	0.0	0.0	0.0
Squaw 1/	601	0.0	0.0	0.0	0.0	2.0	2.0
Tope Creek	G03	0.0	0.0	0.0	0.0	4.0	4.0
Tower 1/	256	0.0	0.0	0.0	3.4	2.0	5.4
Twin Mountain	273	0.0	0.0	0.0	0.0	0.0	0.0
Upper Catherine Creek	281	0.0	0.0	0.0	0.0	30.0	30.0
		0.0	0.0	0.0	0.0	8.5	8.5
TOTAL		0.0	0.0	1.0	28.3	150.0	179.3
1/ Shared with Umatilla NF		0.0	0.0	0.0	0.0	4.0	4.0

Table C-9 (cont.)
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVES B, B-DEPARTURE
DECADE ONE

Date 08/21/25 Roadless Area Name	RARE#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	6.0	22.7	45.0	73.7
Castle Ridge	278	7.2	0.0	0.0	34.0	16.0	57.2
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	7.6	11.4	15.0	34.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	0.0	0.0
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	3.4	13.7	11.0	28.1
Hurricane Creek	288	0.0	0.0	0.0	0.0	0.0	0.0
Joseph Canyon	G04	0.0	0.0	5.7	19.3	10.0	35.0
Lake Fork	290	0.0	2.2	6.6	37.4	24.0	70.2
Little Creek	280	0.0	0.0	0.0	0.0	0.0	0.0
Little Eagle Meadows	283	0.0	0.0	0.0	1.5	7.0	8.5
Little Sheep	286	0.0	0.0	0.0	0.0	0.0	0.0
Marble Point	271	0.0	0.0	0.0	12.8	9.5	22.3
Monument Rock	240	0.0	0.0	0.0	22.3	4.0	26.3
Mount Emily	277	3.4	0.0	0.0	31.9	17.0	52.3
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir	284	0.0	0.0	0.0	0.0	0.0	0.0
Squaw 1/	601	0.0	0.0	0.0	21.7	4.0	25.7
Tope Creek	G03	0.0	0.0	0.0	0.0	0.0	0.0
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	0.0
Twin Mountain	273	7.3	5.9	11.3	63.4	41.5	129.4
Upper Catherine Creek	281	0.0	0.0	5.0	18.6	8.5	32.1
TOTAL		17.9	8.1	45.6	310.7	212.5	594.8
1/ Shared with Umatilla NF		0.0	0.0	7.6	33.1	19.0	59.7

Table C-9 (cont.)
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVE B,B-DEPARTURE
DECADE TWO

Date 08/21/85 Roadless Area Name	Rare#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	3.0	11.3	45.0	59.3
Castle Ridge	278	0.0	0.0	0.0	0.0	16.0	16.0
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	0.0	0.0	15.0	15.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	0.0	0.0
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	6.8	27.3	11.0	45.1
Hurricane Creek	288	0.0	0.0	0.0	2.7	2.0	4.7
Joseph Canyon	G04	0.0	0.0	0.0	0.0	10.0	47.1
Lake Fork	290	0.0	1.1	3.3	18.7	24.0	12.8
Little Creek	280	0.0	0.0	.5	9.3	3.0	7.8
Little Eagle Meadows	283	0.0	0.0	0.0	.8	7.0	0.0
Little Sheep	286	0.0	0.0	0.0	0.0	0.0	15.9
Marble Point	271	0.0	0.0	0.0	6.4	9.5	14.1
Monument Rock	240	0.0	0.0	0.0	10.1	4.0	33.0
Mount Emily	277	0.0	0.0	0.0	16.0	17.0	0.0
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	0.0	41.3
Reservoir	284	0.0	0.0	3.0	27.3	11.0	14.8
Squaw 1/	601	0.0	0.0	0.0	10.8	4.0	0.0
Tope Creek	G03	0.0	0.0	0.0	0.0	0.0	0.0
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	129.4
Twin Mountain	273	7.3	5.9	11.3	63.4	41.5	32.1
Upper Catherine Creek	281	0.0	0.0	5.0	18.6	8.5	
TOTAL		7.3	7.0	32.9	222.7	228.5	498.4
1/ Shared with Umatilla NF		0.0	0.0	0.0	10.8	19.0	29.8

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Table C-9 (cont.)
ROAD MILES BY ROADLESS AREAS BY ALTERNATIVES B, B-DEPARTURE
DECADE THREE

Date 08/21/85 Roadless area Name	Rare#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	0.0	0.0	45.0	45.0
Castle Ridge	278	0.0	0.0	0.0	0.0	16.0	16.0
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	0.0	0.0	15.0	15.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	1.5	1.5
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	0.0	0.0	11.0	11.0
Hurricane Creek	288	0.0	0.0	0.0	1.3	2.0	3.3
Joseph Canyon	G04	0.0	0.0	0.0	0.0	10.0	10.0
Lake Fork	290	0.0	0.0	0.0	0.0	24.0	24.0
Little Creek	280	0.0	0.0	0.0	4.7	3.0	7.7
Little Eagle Meadows	283	0.0	0.0	0.0	0.0	7.0	7.0
Little Sheep	286	0.0	0.0	1.5	28.0	7.0	36.5
Marble Point	271	0.0	0.0	0.0	0.0	9.5	9.5
Monument Rock	240	0.0	0.0	0.0	0.0	4.0	4.0
Mount Emily	277	0.0	0.0	0.0	0.0	17.0	17.0
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir	284	0.0	0.0	0.0	0.0	11.0	11.0
Squaw 1/	601	0.0	0.0	0.0	0.0	4.0	4.0
Tope Creek	G03	0.0	0.0	0.0	3.4	2.0	5.4
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	0.0
Twin Mountain	273	0.0	0.0	0.0	0.0	41.5	41.5
Upper Catherine Creek	281	0.0	0.0	0.0	0.0	8.5	8.5
TOTAL		0.0	0.0	1.5	37.4	239.0	277.9
1/ Shared with Umatilla NF		0.0	0.0	0.0	0.0	20.5	20.5

Table C-9 (cont.)
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVES C, C-DEPARTURE
DECADE ONE

Date 08/21/85 Roadless Area Name	Rare#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	6.0	22.7	45.0	73.7
Castle Ridge	278	5.6	0.0	0.0	26.1	12.0	43.7
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	0.0	0.0	0.0	0.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	0.0	0.0
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	0.0	0.0	0.0	0.0
Hurricane Creek	288	0.0	0.0	3.4	13.7	11.0	28.1
Joseph Canyon	G04	0.0	0.0	0.0	0.0	0.0	0.0
Lake Fork	290	0.0	0.0	5.7	19.3	10.0	35.0
Little Creek	280	0.0	2.2	6.6	37.4	24.0	70.2
Little Eagle Meadows	283	0.0	0.0	0.0	0.0	0.0	0.0
Little Sheep	286	0.0	0.0	0.0	1.5	7.0	8.5
Marble Point	271	0.0	0.0	0.0	0.0	0.0	0.0
Monument Rock	240	0.0	0.0	0.0	12.8	9.5	22.3
Mount Emily	277	0.0	0.0	0.0	32.3	4.0	36.3
North Mount Emily 1/	262	3.4	0.0	0.0	31.9	17.0	52.3
Reservoir	284	0.0	0.0	0.0	0.0	0.0	0.0
Squaw 1/	601	0.0	0.0	0.0	0.0	0.0	0.0
Tope Creek	G03	0.0	0.0	0.0	21.7	4.0	25.7
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	0.0
Twin Mountain	273	0.0	0.0	0.0	0.0	0.0	0.0
Upper Catherine Creek	281	4.3	3.5	6.7	37.8	25.0	77.3
		0.0	0.0	4.3	16.1	7.0	27.4
TOTAL		13.3	5.7	32.7	273.3	175.5	500.5
1/ Shared with Umatilla NF		0.0	0.0	0.0	21.7	4.0	25.7

Table C-9 (cont.)
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVES C, C-DEPARTURE DECADE TWO

Date 08/21/85 Roadless Area Name	Rare#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	3.0	11.3	45.0	59.3
Castle Ridge	278	0.0	0.0	0.0	0.0	12.0	12.0
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	0.0	0.0	0.0	0.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	0.0	0.0
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	6.8	27.3	11.0	45.1
Hurricane Creek	288	0.0	0.0	0.0	.3	.5	.8
Joseph Canyon	G04	0.0	0.0	0.0	0.0	10.0	10.0
Lake Fork	290	0.0	1.1	3.3	18.7	24.0	47.1
Little Creek	280	0.0	0.0	.5	9.3	3.0	12.8
Little Eagle Meadows	283	0.0	0.0	0.0	.8	7.0	7.8
Little Sheep	286	0.0	0.0	0.0	0.0	0.0	0.0
Marble Point	271	0.0	0.0	0.0	6.4	9.5	15.9
Monument Rock	240	0.0	0.0	0.0	0.0	4.0	4.0
Mount Emily	277	0.0	0.0	0.0	16.0	17.0	33.0
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir	284	0.0	0.0	3.0	10.4	4.0	17.4
Squaw 1/	601	0.0	0.0	0.0	10.8	4.0	14.8
Tope Creek	G03	0.0	0.0	0.0	0.0	0.0	0.0
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	0.0
Twin Mountain	273	4.3	3.5	6.7	37.8	25.0	77.3
Upper Catherine Creek	281	0.0	0.0	4.3	16.1	7.0	27.4
TOTAL		4.3	4.6	27.6	165.2	183.0	384.7

1/ Shared with Umatilla NF	0.0	0.0	0.0	10.8	4.0	14.8

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Table C-9 (cont.)
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVES C, C-DEPARTURE
DECADE THREE

Date 08/21/85 Roadless Area Name	Rare#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	0.0	0.0	45.0	45.0
Castle Ridge	278	0.0	0.0	0.0	0.0	12.0	12.0
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	0.0	0.0	0.0	0.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	1.5	1.5
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	0.0	0.0	11.0	11.0
Hurricane Creek	288	0.0	0.0	0.0	0.0	.5	.5
Joseph Canyon	G04	0.0	0.0	0.0	0.0	10.0	10.0
Lake Fork	290	0.0	0.0	0.0	0.0	24.0	24.0
Little Creek	280	0.0	0.0	0.0	4.7	3.0	7.7
Little Eagle Meadows	283	0.0	0.0	0.0	0.0	7.0	7.0
Little Sheep	286	0.0	0.0	0.0	3.5	1.0	4.5
Marble Point	271	0.0	0.0	0.0	0.0	9.5	9.5
Monument Rock	240	0.0	0.0	0.0	0.0	4.0	4.0
Mount Emily	277	3.4	0.0	0.0	0.0	17.0	20.4
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir	284	0.0	0.0	0.0	0.0	4.0	4.0
Squaw 1/	601	0.0	0.0	0.0	0.0	4.0	4.0
Tope Creek	G03	0.0	0.0	0.0	3.4	2.0	5.4
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	0.0
Twin Mountain	273	0.0	0.0	0.0	0.0	25.0	25.0
Upper Catherine Creek	281	0.0	0.0	0.0	0.0	7.0	7.0
TOTAL		3.4	0.0	0.0	11.6	187.5	202.5
1/ Shared with Umatilla NF		0.0	0.0	0.0	0.0	5.5	5.5

Table C-9 (cont.)
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVE D
DECADE ONE

Date 08/21/85 Roadless Area Name	Rare#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	6.0	22.7	45.0	73.7
Castle Ridge	278	5.6	0.0	0.0	26.1	12.0	43.7
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	0.0	0.0	0.0	0.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	0.0	0.0
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	3.4	13.7	11.0	28.1
Hurricane Creek	288	0.0	0.0	0.0	0.0	0.0	0.0
Joseph Canyon	G04	0.0	0.0	5.7	19.3	10.0	35.0
Lake Fork	290	0.0	2.2	6.6	37.4	24.0	70.2
Little Creek	280	0.0	0.0	0.0	0.0	0.0	0.0
Little Eagle Meadows	283	0.0	0.0	0.0	1.5	7.0	8.5
Little Sheep	286	0.0	0.0	0.0	0.0	0.0	0.0
Marble Point	271	0.0	0.0	0.0	12.8	9.5	22.3
Monument Rock	240	0.0	0.0	0.0	22.3	4.0	26.3
Mount Emily	277	3.4	0.0	0.0	31.9	17.0	52.3
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir	284	0.0	0.0	0.0	0.0	0.0	0.0
Squaw 1/	601	0.0	0.0	0.0	21.7	4.0	25.7
Tope Creek	G03	0.0	0.0	0.0	0.0	0.0	0.0
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	0.0
Twin Mountain	273	4.8	3.9	7.4	41.8	27.5	85.4
Upper Catherine Creek	281	0.0	0.0	4.3	16.1	7.0	27.4
TOTAL		13.8	6.1	33.4	267.3	178.0	498.6
1/ Shared with Umatilla NF		0.0	0.0	0.0	21.7	4.0	25.7

Table C-9 (cont.)
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVE D
DECADE TWO

Date 08/21/85 Roadless Area Name	Rare#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	3.0	11.3	45.0	59.3
Castle Ridge	278	0.0	0.0	0.0	0.0	12.0	12.0
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	0.0	0.0	0.0	0.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	0.0	0.0
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	0.0	0.0	0.0	0.0
Hurricane Creek	288	0.0	0.0	6.8	27.3	11.0	45.1
Joseph Canyon	G04	0.0	0.0	0.0	.3	.5	.8
Lake Fork	290	0.0	1.1	3.3	18.7	24.0	47.1
Little Creek	280	0.0	0.0	.5	9.3	3.0	12.8
Little Eagle Meadows	283	0.0	0.0	0.0	.8	7.0	7.8
Little Sheep	286	0.0	0.0	0.0	0.0	0.0	0.0
Marble Point	271	0.0	0.0	0.0	6.4	9.5	15.9
Monument Rock	240	0.0	0.0	0.0	10.1	4.0	14.1
Mount Emily	277	0.0	0.0	0.0	16.0	17.0	33.0
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir	284	0.0	0.0	3.0	10.4	4.0	17.4
Squaw 1/	601	0.0	0.0	0.0	10.8	4.0	14.8
Tope Creek	G03	0.0	0.0	0.0	0.0	0.0	0.0
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	0.0
Twin Mountain	273	4.8	3.9	7.4	41.8	27.5	85.4
Upper Catherine Creek	281	0.0	0.0	4.3	16.1	7.0	27.4
TOTAL		4.8	5.0	28.3	179.3	185.5	402.9
1/ Shared with Umatilla NF		0.0	0.0	0.0	10.8	4.0	14.8

Table C-9 (cont.)
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVE D
DECADE THREE

Date 08/21/85 Roadless Area Name	Rare#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	0.0	0.0	45.0	45.0
Castle Ridge	278	0.0	0.0	0.0	0.0	12.0	12.0
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	0.0	0.0	0.0	0.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	1.5	1.5
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	0.0	0.0	11.0	11.0
Hurricane Creek	288	0.0	0.0	0.0	0.0	.5	.5
Joseph Canyon	G04	0.0	0.0	0.0	0.0	10.0	10.0
Lake Fork	290	0.0	0.0	0.0	0.0	24.0	24.0
Little Creek	280	0.0	0.0	0.0	4.7	3.0	7.7
Little Eagle Meadows	283	0.0	0.0	0.0	0.0	7.0	7.0
Little Sheep	286	0.0	0.0	0.0	3.5	1.0	4.5
Marble Point	271	0.0	0.0	0.0	0.0	9.5	9.5
Monument Rock	240	0.0	0.0	0.0	0.0	4.0	4.0
Mount Emily	277	0.0	0.0	0.0	0.0	17.0	17.0
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir	284	0.0	0.0	0.0	0.0	4.0	4.0
Squaw 1/	601	0.0	0.0	0.0	0.0	4.0	4.0
Tope Creek	G03	0.0	0.0	0.0	3.4	2.0	5.4
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	0.0
Twin Mountain	273	0.0	0.0	0.0	0.0	27.5	27.5
Upper Catherine Creek	281	0.0	0.0	0.0	0.0	7.0	7.0
TOTAL		0.0	0.0	0.0	11.6	190.0	201.6
1/ Shared with Umatilla NF		0.0	0.0	0.0	0.0	5.5	5.5

Table C-9 (cont.)
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVE E
DECADES ONE, TWO & THREE

Date 08/21/85 Roadless Area Name	Rare#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	0.0	0.0	0.0	0.0
Castle Ridge	278	0.0	0.0	0.0	0.0	0.0	0.0
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	0.0	0.0	0.0	0.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	0.0	0.0
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	0.0	0.0	0.0	0.0
Hurricane Creek	288	0.0	0.0	0.0	0.0	0.0	0.0
Joseph Canyon	G04	0.0	0.0	0.0	0.0	0.0	0.0
Lake Fork	290	0.0	0.0	0.0	0.0	0.0	0.0
Little Creek	280	0.0	0.0	0.0	0.0	0.0	0.0
Little Eagle Meadows	283	0.0	0.0	0.0	0.0	0.0	0.0
Little Sheep	286	0.0	0.0	0.0	0.0	0.0	0.0
Marble Point	271	0.0	0.0	0.0	0.0	0.0	0.0
Monument Rock	240	0.0	0.0	0.0	0.0	0.0	0.0
Mount Emily	277	0.0	0.0	0.0	0.0	0.0	0.0
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir	284	0.0	0.0	0.0	0.0	0.0	0.0
Squaw 1/	601	0.0	0.0	0.0	0.0	0.0	0.0
Tope Creek	G03	0.0	0.0	0.0	0.0	0.0	0.0
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	0.0
Twin Mountain	273	0.0	0.0	0.0	0.0	0.0	0.0
Upper Catherine Creek	281	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL		0.0	0.0	0.0	0.0	0.0	0.0
1/ Shared with Umatilla NF		0.0	0.0	0.0	0.0	0.0	0.0

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Table C-9 (cont.)
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVE F
DECADE ONE

Date 08/21/85 Roadless Area Name	Rare#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	0.0	0.0	0.0	0.0
Castle Ridge	278	7.2	0.0	0.0	34.0	16.0	57.2
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	0.0	0.0	0.0	0.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	0.0	0.0
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	3.4	13.7	11.0	28.1
Hurricane Creek	288	0.0	0.0	0.0	0.0	0.0	0.0
Joseph Canyon	G04	0.0	0.0	0.0	0.0	0.0	0.0
Lake Fork	290	0.0	0.0	0.0	0.0	0.0	0.0
Little Creek	280	0.0	0.0	0.0	0.0	0.0	0.0
Little Eagle Meadows	283	0.0	0.0	0.0	0.0	0.0	0.0
Little Sheep	286	0.0	0.0	0.0	0.0	0.0	0.0
Marble Point	271	0.0	0.0	0.0	12.8	9.5	22.3
Monument Rock	240	0.0	0.0	0.0	32.3	4.0	36.3
Mount Emily	277	1.0	0.0	0.0	11.5	4.0	16.5
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir	284	0.0	0.0	0.0	0.0	0.0	0.0
Squaw 1/	601	0.0	0.0	0.0	21.7	4.0	25.7
Tope Creek	G03	0.0	0.0	0.0	0.0	0.0	0.0
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	0.0
Twin Mountain	273	4.3	3.5	6.7	37.8	25.0	77.3
Upper Catherine Creek	281	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL		12.5	3.5	10.1	163.8	73.5	263.4
1/ Shared with Umatilla NF		0.0	0.0	0.0	21.7	4.0	25.7

Table C-9 (cont.)
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVE F
DECADE TWO

Date 08/20/85 Roadless Area Name	Rare#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	0.0	0.0	0.0	0.0
Castle Ridge	278	0.0	0.0	0.0	0.0	16.0	16.0
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	0.0	0.0	0.0	0.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	0.0	0.0
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	6.8	27.3	11.0	45.1
Hurricane Creek	288	0.0	0.0	0.0	0.0	0.0	0.0
Joseph Canyon	G04	0.0	0.0	0.0	0.0	0.0	0.0
Lake Fork	290	0.0	0.0	0.0	0.0	0.0	0.0
Little Creek	280	0.0	0.0	0.0	0.0	0.0	0.0
Little Eagle Meadows	283	0.0	0.0	0.0	0.0	0.0	0.0
Little Sheep	286	0.0	0.0	0.0	0.0	0.0	0.0
Marble Point	271	0.0	0.0	0.0	6.4	9.5	15.9
Monument Rock	240	0.0	0.0	0.0	0.0	4.0	4.0
Mount Emily	277	0.0	0.0	0.0	0.0	4.0	4.0
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir	284	0.0	0.0	0.0	0.0	0.0	0.0
Squaw 1/	601	0.0	0.0	0.0	10.8	4.0	14.8
Tope Creek	G03	0.0	0.0	0.0	0.0	0.0	0.0
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	0.0
Twin Mountain	273	4.3	3.5	6.7	37.8	25.0	77.3
Upper Catherine Creek	281	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL		4.3	3.5	13.5	82.3	73.5	177.1
1/ Shared with Umatilla NF		0.0	0.0	0.0	10.8	4.0	14.8

Table C-9 (cont.)
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVE F
DECADE THREE

Date 08/21/85 Roadless Area Name	Rare#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	0.0	0.0	0.0	0.0
Castle Ridge	278	0.0	0.0	0.0	0.0	16.0	16.0
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	0.0	0.0	0.0	0.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	0.0	0.0
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	0.0	0.0	11.0	11.0
Hurricane Creek	288	0.0	0.0	0.0	0.0	0.0	0.0
Joseph Canyon	G04	0.0	0.0	0.0	0.0	0.0	0.0
Lake Fork	290	0.0	0.0	0.0	0.0	0.0	0.0
Little Creek	280	0.0	0.0	0.0	0.0	0.0	0.0
Little Eagle Meadows	283	0.0	0.0	0.0	0.0	0.0	0.0
Little Sheep	286	0.0	0.0	0.0	0.0	0.0	0.0
Marble Point	271	0.0	0.0	0.0	0.0	9.5	9.5
Monument Rock	240	0.0	0.0	0.0	0.0	4.0	4.0
Mount Emily	277	0.0	0.0	0.0	0.0	4.0	4.0
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir	284	0.0	0.0	0.0	0.0	0.0	0.0
Squaw 1/	601	0.0	0.0	0.0	0.0	4.0	4.0
Tope Creek	G03	0.0	0.0	0.0	3.4	2.0	5.4
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	0.0
Twin Mountain	273	0.0	0.0	0.0	0.0	25.0	25.0
Upper Catherine Creek	281	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL		0.0	0.0	0.0	3.4	75.5	78.9
1/ Shared with Umatilla NF		0.0	0.0	0.0	0.0	4.0	4.0

Table C-9 (cont.)
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVE G
DECADE ONE

Date 08/21/85 Roadless Area Name	Rare#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	6.0	22.7	45.0	73.7
Castle Ridge	278	7.2	0.0	0.0	34.0	16.0	57.2
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	7.6	11.4	15.0	34.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	0.0	0.0
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	3.4	13.7	11.0	28.1
Hurricane Creek	288	0.0	0.0	0.0	0.0	0.0	0.0
Joseph Canyon	G04	0.0	0.0	5.7	19.3	10.0	35.0
Lake Fork	290	0.0	0.0	0.0	0.0	0.0	0.0
Little Creek	280	0.0	0.0	0.0	0.0	0.0	0.0
Little Eagle Meadows	283	0.0	0.0	0.0	1.5	7.0	8.5
Little Sheep	286	0.0	0.0	0.0	0.0	0.0	0.0
Marble Point	271	0.0	0.0	0.0	12.8	9.5	22.3
Monument Rock	240	0.0	0.0	0.0	22.3	4.0	26.3
Mount Emily	277	3.4	0.0	0.0	31.9	8.0	43.3
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir	284	0.0	0.0	0.0	0.0	0.0	0.0
Squaw 1/	601	0.0	0.0	0.0	21.7	4.0	25.7
Tope Creek	G03	0.0	0.0	0.0	0.0	0.0	0.0
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	0.0
Twin Mountain	273	7.3	5.9	11.3	63.4	41.5	129.4
Upper Catherine Creek	281	0.0	0.0	5.0	18.6	8.5	32.1
TOTAL		17.9	5.9	39.0	273.3	179.5	515.6
1/ Shared with Umatilla NF		0.0	0.0	7.6	33.1	19.0	59.7

Table C-9 (cont)
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVE G
DECADE TWO

Date 08/21/85 Roadless Area Name	Rare#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	3.0	11.3	45.0	59.3
Castle Ridge	278	0.0	0.0	0.0	0.0	16.0	16.0
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	0.0	0.0	15.0	15.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	0.0	40.0
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	6.8	27.3	11.0	45.1
Hurricane Creek	288	0.0	0.0	0.0	0.0	0.0	0.0
Joseph Canyon	G04	0.0	0.0	0.0	0.0	10.0	10.0
Lake Fork	290	0.0	0.0	0.0	0.0	0.0	0.0
Little Creek	280	0.0	0.0	.5	9.3	3.0	12.8
Little Eagle Meadows	283	0.0	0.0	0.0	.8	7.0	7.8
Little Sheep	286	0.0	0.0	0.0	0.0	0.0	0.0
Marble Point	271	0.0	0.0	0.0	6.4	9.5	15.9
Monument Rock	240	0.0	0.0	0.0	10.1	4.0	14.1
Mount Emily	277	0.0	0.0	0.0	16.0	8.0	24.0
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir	284	0.0	0.0	3.0	27.3	10.5	40.8
Squaw 1/	601	0.0	0.0	0.0	10.8	4.0	14.8
Tope Creek	G03	0.0	0.0	0.0	0.0	0.0	0.0
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	0.0
Twin Mountain	273	7.3	5.9	11.3	63.4	41.5	129.4
Upper Catherine Creek	281	0.0	0.0	5.0	18.6	8.5	32.1
TOTAL		7.3	5.9	29.6	201.3	193.0	437.1
1/ Shared with Umatilla NF		0.0	0.0	0.0	10.8	19.0	29.8

Table C-9 (cont.)
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVE G
DECADE THREE

DATE 08/21/85 ROADLESS AREA NAME	RARE#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	0.0	0.0	45.0	45.0
Castle Ridge	278	0.0	0.0	0.0	0.0	16.0	16.0
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	0.0	0.0	15.0	15.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	0.0	0.0
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	0.0	0.0	0.0	0.0
Hurricane Creek	288	0.0	0.0	0.0	0.0	11.0	11.0
Joseph Canyon	G04	0.0	0.0	0.0	0.0	0.0	0.0
Lake Fork	290	0.0	0.0	0.0	0.0	10.0	10.0
Little Creek	280	0.0	0.0	0.0	4.7	3.0	7.7
Little Eagle Meadows	283	0.0	0.0	0.0	0.0	7.0	7.0
Little Sheep	286	0.0	0.0	1.5	28.0	7.0	36.5
Marble Point	271	0.0	0.0	0.0	0.0	9.5	9.5
Monument Rock	240	0.0	0.0	0.0	0.0	4.0	4.0
Mount Emily	277	0.0	0.0	0.0	0.0	8.0	8.0
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir	284	0.0	0.0	0.0	0.0	10.5	10.5
Squaw 1/	601	0.0	0.0	0.0	0.0	4.0	4.0
Tope Creek	G03	0.0	0.0	0.0	3.4	2.0	5.4
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	0.0
Twin Mountain	273	0.0	0.0	0.0	0.0	41.5	41.5
Upper Catherine Creek	281	0.0	0.0	0.0	0.0	8.5	8.5
TOTAL		0.0	0.0	1.5	36.1	202.0	239.6
1/ Shared with Umatilla NF .		0.0	0.0	0.0	0.0	19.0	19.0

Table C-9 (cont.)
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVE H
DECADE ONE

Date 08/21/85 Roadless Area Name	Rare#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	6.0	22.7	45.0	73.7
Castle Ridge	278	5.6	0.0	0.0	26.1	12.0	43.7
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	0.0	0.0	0.0	0.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	0.0	0.0
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	3.4	13.7	11.0	28.1
Hurricane Creek	288	0.0	0.0	0.0	0.0	0.0	0.0
Joseph Canyon	G04	0.0	0.0	5.7	19.3	10.0	35.0
Lake Fork	290	0.0	2.2	6.6	37.4	23.5	69.7
Little Creek	280	0.0	0.0	0.0	0.0	0.0	0.0
Little Eagle Meadows	283	0.0	0.0	0.0	1.5	7.0	8.5
Little Sheep	286	0.0	0.0	0.0	0.0	0.0	0.0
Marble Point	271	0.0	0.0	0.0	12.8	9.5	22.3
Monument Rock	240	0.0	0.0	0.0	32.3	4.0	36.3
Mount Emily	277	3.4	0.0	0.0	31.9	8.0	43.3
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir	284	0.0	0.0	0.0	0.0	0.0	0.0
Squaw 1/	601	0.0	0.0	0.0	21.7	4.0	25.7
Tope Creek	G03	0.0	0.0	0.0	0.0	0.0	0.0
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	0.0
Twin Mountain	273	4.3	3.5	6.7	37.8	25.0	77.7
Upper Catherine Creek	281	0.0	0.0	4.3	16.1	7.0	27.4
TOTAL		13.3	5.7	32.7	273.3	166.0	491.0
1/ Shared with Umatilla NF		0.0	0.0	0.0	21.7	4.0	25.7

Table C-9 (cont.)
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVE H
DECADE TWO

Date 08/21/85 Roadless Area Name	Rare#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	3.0	11.3	45.0	59.3
Castle Ridge	278	0.0	0.0	0.0	0.0	12.0	12.0
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	0.0	0.0	0.0	0.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	0.0	0.0
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	6.8	27.3	11.0	45.1
Hurricane Creek	288	0.0	0.0	0.0	.3	.5	.8
Joseph Canyon	G04	0.0	0.0	0.0	0.0	10.0	10.0
Lake Fork	290	0.0	1.1	3.3	18.7	23.5	46.6
Little Creek	280	0.0	0.0	.5	9.3	3.0	12.8
Little Eagle Meadows	283	0.0	0.0	0.0	.8	7.0	7.8
Little Sheep	286	0.0	0.0	0.0	0.0	0.0	0.0
Marble Point	271	0.0	0.0	0.0	6.4	9.5	15.9
Monument Rock	240	0.0	0.0	0.0	0.0	4.0	4.0
Mount Emily	277	0.0	0.0	0.0	16.0	8.0	24.0
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir	284	0.0	0.0	3.0	10.4	4.0	17.4
Squaw 1/	601	0.0	0.0	0.0	10.8	4.0	14.8
Tope Creek	G03	0.0	0.0	0.0	0.0	0.0	0.0
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	0.0
Twin Mountain	273	4.3	3.5	6.7	37.8	25.0	77.3
Upper Catherine Creek	281	0.0	0.0	4.3	16.1	7.0	27.4
TOTAL		4.3	4.6	27.6	165.2	173.5	375.2
1/ Shared with Umatilla NF		0.0	0.0	0.0	10.8	4.0	14.8

Table C-9 (cont.)
ROAD MILES BY ROADLESS AREAS IN ALTERNATIVE H
DECADE THREE

Date 08/21/85 Roadless Area Name	Rare#	Arterial& Collector Reconst	Arterial& Collector Const	Local Reconst	Local Const	Temp	Totals
Boulder Park	282	0.0	0.0	0.0	0.0	45.0	45.0
Castle Ridge	278	0.0	0.0	0.0	0.0	12.0	12.0
Deadhorse	G08	0.0	0.0	0.0	0.0	0.0	0.0
Dunns Bluff	WW1	0.0	0.0	0.0	0.0	0.0	0.0
Grande Ronde 1/	267	0.0	0.0	0.0	0.0	0.0	0.0
Greenhorn 1/	252	0.0	0.0	0.0	0.0	0.0	0.0
Hellhole 1/	261	0.0	0.0	0.0	0.0	0.0	0.0
Homestead	291	0.0	0.0	0.0	0.0	0.0	0.0
Huckleberry	289	0.0	0.0	0.0	0.0	11.0	11.0
Hurricane Creek	288	0.0	0.0	0.0	0.0	.5	.5
Joseph Canyon	G04	0.0	0.0	0.0	0.0	10.0	10.0
Lake Fork	290	0.0	0.0	0.0	0.0	23.5	23.5
Little Creek	280	0.0	0.0	0.0	4.7	3.0	7.7
Little Eagle Meadows	283	0.0	0.0	0.0	0.0	7.0	7.0
Little Sheep	286	0.0	0.0	0.0	3.5	1.0	4.5
Marble Point	271	0.0	0.0	0.0	0.0	9.5	9.5
Monument Rock	240	0.0	0.0	0.0	0.0	4.0	4.0
Mount Emily	277	0.0	0.0	0.0	0.0	8.0	8.0
North Mount Emily 1/	262	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir	284	0.0	0.0	0.0	0.0	4.0	4.0
Squaw 1/	601	0.0	0.0	0.0	0.0	4.0	4.0
Tope Creek	G03	0.0	0.0	0.0	3.4	2.0	5.4
Tower 1/	256	0.0	0.0	0.0	0.0	0.0	0.0
Twin Mountain	273	0.0	0.0	0.0	0.0	25.0	25.0
Upper Catherine Creek	281	0.0	0.0	0.0	0.0	7.0	7.0
TOTAL		0.0	0.0	0.0	11.6	176.5	188.1
1/ Shared with Umatilla NF		0.0	0.0	0.0	0.0	4.0	4.0

Appendix D

STANDARDS AND GUIDELINES FOR ALL ALTERNATIVES

Some of the management activities on the Forest would cause significant environmental damage if they were to occur without some means of mitigating that potential harm. Because we are able to anticipate many of those adverse environmental effects we can design and prescribe, in advance, ways to prevent or mitigate that damage.

These mitigation measures, consisting of a broad scope of actions that avoid, minimize, rectify, reduce, or compensate for environmental effects, are found in multiple-use Standards and Guidelines. Some of the standards and guidelines are taken directly from the Pacific Northwest Regional Guide, while most were developed by the interdisciplinary team.

The standards and guidelines for the preferred alternative are found in Chapter 4 of the proposed Forest Plan accompanying this DEIS. Nearly all of these standards and guidelines apply to all other Forest Plan alternatives (except Alternative A, the current direction alternative). The reader is encouraged to review these standards and guidelines as they will provide a much better understanding of the activities which would occur under any Forest Plan alternative. The standards and guidelines described here are those which differ from or are in addition to those for the preferred alternative (Alternative C).

Alternative A (Current Direction)

Standards and Guidelines for Alternative A are found in the management direction for the unit plans listed below. Copies of these plans are available for public review at the National Forest Headquarters in Baker, Oregon.

Burnt Powder Unit Plan
Grande Ronde Unit Plan
Wallowa Valley Unit Plan
Desolation Unit Plan
Elgin Unit Plan
Hells Canyon NRA Comprehensive Management Plan

Alternatives B and B-Departure

Transportation System

Road development is permitted within the Joseph Canyon roadless area with an open-road density not to exceed 2.5 miles per square mile.

Roads within the Five Points Creek drainage may remain open to public use with an open-road density of 2.5 miles per square mile or less.

Recreation

Forest landscapes will be managed with visual quality objectives (outside the NRA) reduced one objective level.

Alternative D

Transportation System

Road development is permitted within the Joseph Canyon roadless area with an open road density not to exceed 2.5 miles per square mile.

Alternative E

Municipal Watersheds

Timber harvest and additional road development within the Baker domestic supply watershed will not occur except as specified in Management Strategy 6.

Transportation System

Timber harvest and road construction within the Joseph Canyon roadless area and the Five Points Creek drainage will not occur except as specified in Management Strategy 6.

Recreation

Forest landscapes will be managed with visual quality objectives (outside the HCNRA) reduced one objective level.

Alternative F

Wildlife

Where timber management occurs outside of riparian areas, stands will be managed to provide habitat for snag dependent wildlife species at not less than 40 percent level as defined by Thomas (1979).

Alternative G

Transportation System

Road development is permitted within the Joseph Canyon roadless area with an open road density not to exceed 2.5 miles per square mile.

Roads within the Five Points Creek drainage may be made open to public use with an open-road density of 2.5 miles per square mile or less.

Recreation

Forest landscapes will be managed with visual quality objectives (outside the HCNRA) reduced one objective level.

Timber

Timber harvest will be limited to those stands and practices where an economic analysis indicates that the discounted costs of timber management are less than the discounted benefits.

Alternatives B, B-Departure, E and G

These alternatives contain a management strategy (MS 2) not included in the proposed action. A description of Management Strategy 2 follows:

Management Strategy 2 emphasizes wood fiber and forage production although timber harvest scheduling is constrained to provide greater recreational variety and wildlife diversity than is found in Management Strategy 1.

Timber areas consist of numerous timber stands of a variety of ages. Regeneration harvest of units adjacent to an existing regenerated unit will not be initiated until 80 percent of the desired crop tree stocking on the existing unit reaches ten feet in height. Roads open to public use generally do not exceed 1.5 miles per square mile.

Direction

Watershed. No change from standards and guidelines.

Wildlife. No change from standards and guidelines.

Timber. Timber management will be identical to that of Management Strategy 1 except that a harvested area of commercial forest land will be consered a created opening until 80 percent of the prescribed stocking level is reached and this stock consists of trees 10 feet, or greater, in height.

Transportation. Management of the transportation system will be identical to that of Management Strategy 1 except that roads left open year long on summer ranges will, in general, be limited to 1.5 miles per square mile. Winter ranges will be managed so that roads open to public travel will normally not exceed the 1.5 mile per square mile standard during critical

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big game use periods. Where winter snowfall normally achieves the desired results, additional barriers need not be constructed. On winter ranges closure to snowmobiles may be necessary to reduce conflicts with big game use.

Range. No change from Management Strategy 1.

Recreation. No change from Management Strategy 1.

Visuals. No change from standards and guidelines.

Insects and Diseases. No change from Management Strategy 1.

Landownership. No change from Management Strategy 1.

Minerals. No change from standards and guidelines.

Fire. No change from Management Strategy 1.

Planning Assumptions

No change from Management Strategy 1 except as follows:

Timber

- Commercial harvest of some stands may be delayed for one decade to permit adequate height of adjacent regenerated stands.

Transportation

- Snow will effectively close most winter range areas to access by wheeled vehicles during the winter months. Consequently, road closures more restrictive than those applied to Management Strategy 1 will not normally be necessary on winter ranges.

Wildlife

- Management of this area will result in an average habitat effectiveness index of 72 percent of potential (including discounting for roads), although individual sites may have higher or lower values.

Appendix E

DETERMINATION OF LAND SUITABILITY FOR TIMBER PRODUCTION

Introduction

The National Forest Management Act regulations discuss suitability in several places. Section 219.3 defines suitability, in general, as "the appropriateness of applying certain resource management practices to a particular area of land, as determined by an analysis of the economic and environmental consequences and the alternative uses foregone. A unit of land may be suitable for a variety of individual or combined management practices." Section 219.14 focuses on timber suitability stating that land will be considered unsuited for timber production if:

1. The land is not forest land as defined in Section 219.3.
2. Technology is not available to ensure timber production from the land without irreversible resource damage to soils productivity or watershed conditions.
3. There is not reasonable assurance that such lands can be adequately restocked as provided in Section 219.27(c)(3).
4. The land has been withdrawn from timber production by an Act of Congress, the Secretary of Agriculture, or the Chief of the Forest Service.

These criteria can be summarized by saying that land will be considered suitable for timber production if it is capable, available and technically suited under currently available management techniques. The processes used for making these determinations on the Wallowa-Whitman are described in the following paragraphs.

An additional suitability screen, economic suitability, is dependent upon the objectives of the various alternatives and is dealt with in the sections dealing with alternatives and their effects (Chapters II and IV) and in Appendix B.

Capability

The first phase of the suitability determination (identification of capable lands) relied heavily on the Wallowa-Whitman timber inventory, which was conducted in 1978-79. As a part of this inventory the Forest was classified into the following categories:

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1. Water - streams, sloughs, lakes, ponds, reservoirs more than 120 feet wide and more than an acre in size.

2. Nonforest - land that has apparently never supported trees (grassland, rock barrens, meadows, etc.) and lands formerly forested but now precluded from timber production by other uses (improved roads, helispots, railroad rights-of-way, pipelines, etc.).

3. Unproductive land - forest land incapable of yielding 20 cu. ft./acre/year because of adverse site conditions, or land considered permanently inoperable because of rockiness. Lands incapable of yielding 20 cubic feet of industrial wood were considered unsuited during the initial suitability determination because: 1) the 1979 timber inventory, the source for most timber-related data, used 20 cubic feet as the cutoff between productive and unproductive lands; 2) there is very little historical data about management of less productive sites (i.e., the techniques and costs involved in managing these lands are unknown); and 3) because of the relatively low timber volume likely to exist on these sites and the low rate of growth it is not expected that they would make substantial contribution to timber harvest levels. Included are saturated and poorly drained forest land which produces stunted and deformed trees; alpine forests at the upper limits of tree growth; steep rock areas with cliffs, ledges, and talus slopes; and forest lands capable of producing only noncommercial tree species.

4. Capable forest lands - forest land which is producing or capable of producing crops of industrial wood in excess of 20 cu. ft./acre of annual growth. This includes both accessible and inaccessible areas. nonstocked areas which are stockable and otherwise meet this definition are included.

Areas where the productivity was in question were visited on the ground. Growth was determined using the Growth Basal Area (GBA)1/ technique and the sites were classified as above.

Under original planning direction, lands not capable of producing 20 cu. feet of timber growth per year were automatically considered unsuited. Subsequent planning direction required that these lands be further evaluated to determine if they were available and technically suited for timber production. This process is described later in this appendix.

1/ Hall, Frederick C. A Method for Evaluating Forest Productivity and Stock Density: Site Index and Growth Basal Area (SI-GBA). U. S. Department of Agriculture, Forest Service, Pacific Northwest Region.

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Availability

There are presently six areas on the Wallowa-Whitman that have been legislatively or administratively withdrawn from timber harvest. These areas are listed below:

	Net National Forest Areas	
	Total	Forested
Eagle Cap Wilderness	345,915	141,013
Hells Canyon Wilderness	213,993	68,183
Monument Rock Wilderness	7,283	6,690
North Fork John Day Wilderness	15,509	14,855
NRA Snake Wild and Scenic River Corridor	14,355	0
Indian Creek Research Natural Area	974	882
Total	598,029	231,623

Technical Suitability of Lands Capable of Producing 20 Cubic Feet/Acre/Year

Determination of technical suitability began early in the Forest planning process. The following is a summary of the steps involved. (Maps, internal and external communication, and mapping standards are available at the National Forest Headquarters in Baker, Oregon.)

Ranger District silviculturists identified those acres of productive forest land on which regeneration within five years could not be reasonably assured. These delineations were made on 4-inch per mile orthophotos and were based primarily on difficulties experienced in past regeneration attempts. Where the reasons for the experienced difficulty were known these reasons were documented. This process identified three general types of regeneration difficulty:

1. Shallow, droughty soils. These are sites where high moisture stress is expected. Planting is frequently hindered by the high rock content of the soil.

2. Severe competition from brush, primarily ninebark. The presence of these shrubs has reduced regeneration success on some Douglas-fir dominated sites.

3. High elevation sites with cold soils. The concern was that the harsh conditions experienced at these high elevations would prevent adequate site regeneration within five years.

A Forest soil scientist identified areas which were unsuitable for timber harvest because extreme soil instability would result in irreversible resource damage or because shallow, droughty soils precluded successful regeneration.

Soils identified as shallow and droughty largely coincided with areas previously identified as unproductive or with regeneration difficulty by silviculturists. The vast majority of soil instability areas lie within the Eagle Cap Wilderness and are not available for timber production. These determinations were made using 1:80,000 black and white aerial photos.

The soil scientist and silviculturists resolved differences between their maps to arrive at a single overlay delineating technically unsuited lands.

The maps and criteria were reviewed by a team of Regional Office timber and watershed specialists. Following this review suitability criteria to be applied Region-wide were developed. Application of these Regional criteria returned brush competition and high elevation cold soil areas to the suitable land base. The Regional suitability criteria for shallow, droughty, rocky soils required a degree of soils and climatological data not available on the Wallowa-Whitman. It was assumed that the acres identified as shallow, droughty, or rocky by the Forest specialists approximate the acres which would have been identified through the application of the Regional criteria.

A field review of the ninebark brushfield competition areas by representatives of the Wallowa-Whitman, the Regional Office, and the timber industry reaffirmed that these areas are normally suitable for timber production. Based on this field review, it was estimated that 20 percent of the ninebark sites actually were shallow-soiled, droughty sites unsuited for timber production. For calculation of timber yields, 20 percent of these ninebark sites are assumed to be unsuited.

In 1984, at the request of the Northwest Pine Association (a group representing a portion of the timber industry), a review was made of the Forest's land suitability determination. This review was conducted by the Forest Silviculturist and Forest Soil Scientist and included a field review on each Ranger District of the land suitability mapping. Ten to 20 sites were visited on each District and the adequacy of the mapping was assessed. Following the field review and based on its findings mapping corrections were made. In some areas more suited lands were identified and in other areas additional unsuited lands were found. The net result was that some 35,000 fewer acres were identified as unsuited for timber management. These changes were primarily due to two factors: (1) in the original determination of restockability a site was not considered adequately restocked unless it contained 250-300 trees per acre. The current Regional stocking standard for the Forest types on the Wallowa-Whitman is 75 trees per acre. Many areas where restocking to 250-300 trees per acre could not be reasonably assured could easily be restocked to 75 trees per acre; and (2) in the four years since the original suitability determination, the silviculturists on the Forest have substantially more experience in reforestation.

Suitability Assessment of Lands Producing Less Than 20 Cubic Feet/Acre/Year

With the new NFMA implementing regulations of September 30, 1982 (36 CFR 219), the Chief's 1920 letter of July 15, 1983 and subsequent Regional planning direction it became necessary to assess the timber management suitability of forest lands producing (or capable of producing) less than 20 cubic feet per acre per year (previously termed unproductive forest land).

On the Wallowa-Whitman the data base for distinguishing among nonforest land, unproductive forest land, and productive forest land is the TRI (Total Resource Information) data base. It indicates some 340,000 acres of unproductive forest land, of which 40 percent is within proclaimed wilderness.

In preliminary reviews of the 200,000 acres of unproductive forest outside wilderness it became apparent that much was actually nonforest (grassland, rock, etc.). This misclassification came about because at the time of the original ecoclass mapping (part of the 1979 timber inventory) there was no apparent need to differentiate accurately between nonforest and unproductive forest since neither were to be managed for timber production. Similar misclassification did not appear to be significant in lands previously classified as nonforest or productive forest.

The problem then on the Wallowa-Whitman was to assess 1) how much of the land classified as unproductive forest actually fits that classification? 2) how much of the actual unproductive forest land was suited for timber management under 36 CFR 219.14(a) 2 and 3, and 3) what is the proper classification for the remaining acres?

A number of alternatives for assessing the suitability of these lands were considered including: 1) remapping of unproductive forest lands, 2) reviewing through aerial photo interpretation, each cell classified as unproductive in TRI (approximately 11,000 cells outside proclaimed wilderness, and 3) a sampling procedure whereby some of the 11,000 unproductive cells would be reviewed through aerial photo interpretation and the results of the review applied to the total unproductive area.

Use of a sampling procedure was approved by the Regional Forester on December 1, 1983. A major consideration in taking this approach was the length of time required for either remapping unproductive forest or reviewing all 11,000 cells.

It was decided to begin with approximately a 10 percent sample with the understanding that additional cells could be reviewed if needed to achieve adequate statistical reliability. The process was as follows:

1. A Total Resource Information (TRI) extract (list) of all unproductive forest cells was made. Initially these were combined into three groups: spruce-fir (CW, CA, CE), ponderosa pine/Douglas-fir (CP-CD),

and lodgepole pine (LP) but since there were only 600 acres of lodgepole pine type identified as unproductive forest land these were grouped with the spruce-fir.

2. Since all TRI cells are numbered and the numbers are unrelated to physical characteristics of the cells, these numbes were used to select the cells to be sampled. All cells ending in "5" were selected. Cells which were too small to review using aerial photos (less than 5 acres) were eliminated from the sample and the next cell on the TRI extract which was five acres or larger was included as a replacement.

3. All sample cells were delineated on 4-inch/mile TRI orthophoto maps. These served as a place to document results.

4. Each sample cell was reviewed on resource photography by the Forest Soil Scientist and the District Silviculturist using criteria from the November 10, 1983 Regional direction package. For each cell the following were estimated:

   a) Percent nonforest
   b) Percent productive forest
   c) Percent productive, suitable forest
   d) Percent unproductive forest
   e) Percent unproductive, suitable forest

   Where forest land (either productive or unproductive) was determined to be unsuited for timber management the reasons were documented. Estimates were made to be the nearest 5 percent. Stringers less than two chains wide were ignored as were stands less than two acres in size which could not be combined with adjacent stands.

5. Percentages in the various categories for each cell were multiplied by the total acreage of the cell to arrive at acres of each category.

6. Statistical adequacy of the sample was assessed by performing linear regressions on the relationships of acres of nonforest and unproductive forest, with total cell size.

Results

A total of 985 cells were reviewed. Of these 652 were within the spruce-fir-lodgepole group and 333 were within the ponderosa pine/Douglas-fir group. Sample size, as a percentage of total acres, was 15.4 percent for the spruce-fir-lodgepole group with 8.8 percent of the cells sampled. In the ponderosa pine/Douglas-fir group the sample was 12.7 percent with the total acres with 9.5 percent of the cells sampled. Table E-1 shows sample results.

Table E-1
Sample Results (Percentages)

Species Group	Acres Sampled	% Nonforest	% Productive Forest 1/	% Productive Suitable	% Unproductive Forest 1/	% Unproductive Suitable
CW/CA/ CL/CE	20602	86.13	4.64	2.76	9.23	0.19
CP/CD	9346	85.62	4.44	3.21	9.94	0.13

1/ Includes both suitable and unsuitable acres.

When these percentages are applied to the total available, unproductive forest acreage the results are as shown in Table E-2.

Table E-2
Sample Results (Acres)

Species Group	Classified Unproductive Acres From TRI 1/	Nonforest Acres	Productive Forest Acres 2/	Productive Suitable Acres	Unproductive Forest Acres 2/	Unproductive Suitable Acres
CW/CA/ CL/CE	133,157	114,689	6,175	3,677	12,293	251
CP/CD	73,031	62,527	3,242	2,341	7,262	96
TOTAL	206,188	177,216	9,417	6,018	19,555	347

1/ Some of these lands became wilderness following passage of the Oregon Wilderness Bill of 1984.
2/ Includes both suitable and unsuitable acres.

As can be seen from the table, most lands previously classified as unproductive forest are actually nonforest. Of those lands meeting the definition of unproductive forest few are considered suitable for timber management. Nearly all of those lands identified as unsuitable forest were unsuited due to regeneration difficulty caused by shallow soils. Other factors which entered into the suitability determination on some lands were: excessive rockiness (too rocky to plant and inadequate assurance that natural regeneration would occur); excessive moisture due to wet meadows or springs; avalanche paths; and cold soils.

Table E-2 was used to complete the land suitability display shown in Table E-3. One concern in developing the display was placement of the productive forest inclusions (9,417 acres) within the unproductive forest land base. Nonforest inclusions within the productive forest base were assumed to compensate for this, so the productive acreage was included in the nonforest acreage.

The 347 acres of suitable lands producing less than 20 cubic feet per acre per year, if managed for timber production, would provide a long-term sustained yield of approximately 5,000 cubic feet per year. This amounts to approximately 0.013% of the long-term sustained yield from productive forest lands based upon current land allocations. The suitable land display (Table E-3) shows these acres in the unsuited base.

Limitations of the Suitability Determination

Both the silvicultural and soils mapping of unsuited areas rely heavily on the professional judgment and experience of the specialists involved. The results of this subjective analysis are probably more difficult to reproduce and less accurate than an analysis based on field-gathered data.

It is likely that some acreage which is actually suitable for timber production will be labeled "unsuited" for this planning period and other areas which are actually unsuitable for timber production will be labeled "suited." This is due primarily to inaccuracies in the data available. It is assumed that these acreages will balance out.

Historically, high elevation-cold soil areas and sites with ninebark plant communities have been difficult to reforest. For this and other reasons (including the high logging costs) timber harvest in these areas has been largely avoided. To some degree the ability to reforest these areas will remain in question until successful examples are available. If, in fact, available technology does not provide adequate reforestation, correction in suitable acres will be needed in future planning updates.

Information Needed for Future Planning

- Mapping of soil characteristics with a degree of detail that will permit comparison with Regional or similar suitability standards.

- Local data substantiating or disproving the suitability of the ninebark community types.

- Local data substantiating or disproving the suitability of the high elevation-cold soil sites on the Forest.

- Field verification of shallow, droughty unsuited areas.

Table E-3
LAND SUITABILITY FOR TIMBER MANAGEMENT

	NOT SUITED FOR TIMBER PRODUCTION	SUITED FOR TIMBER PRODUCTION	TOTALS
I. TOTAL NATIONAL FOREST AREA (ACRES)			2,667,961
A. OTHER OWNERSHIPS	318,746		
II. NET NATIONAL FOREST AREA			2,349,215
A. WATER	5,386		
B. NONFOREST (NOT STOCKED WITH 10% TREE COVER)	921,218 1/		
C. ROADS	10,686		
III. FORESTED LANDS			1,411,925
A. WITHDRAWN FROM SCHEDULED TIMBER PRODUCTION (219.14(a)(4))			
1. WILDERNESS			
EAGLE CAP	134,900 2/ 6,113 3/		
HELLS CANYON	64,504 2/ 3,679 3/		
MONUMENT ROCK	5,972 2/ 718 3/		
N. FK. JOHN DAY	11,603 2/ 3,252 3/		
2. INDIAN CREEK RESEARCH NATURAL AREA	876 2/ 6 3/		

1/ Nonforest (605,214 ac.) plus nonforest from Forest-wide analysis of lands classified as unproductive forest (316,004).

2/ Lands capable of producing 20 cubic feet of commercial wood fiber annually.

3/ Lands not capable of producing 20 cubic feet of commercial wood fiber annually.

Table E-3 (Cont)
LAND SUITABILITY FOR TIMBER MANAGEMENT

	NOT SUITED FOR TIMBER PRODUCTION	SUITED FOR TIMBER PRODUCTION
3. STARKEY EXPERIMENTAL FOREST AND RANGE		15,823 4/
4. HCNRA "FORAGE" ALLOCATION		39,620 4/
5. HCNRA "DISPERSED RECREATION/ NATIVE VEGETATION" ALLOCATION		51,690 4/
SUBTOTAL	231,623	107,133
B. LANDS GROWING LESS THAN 20 CUBIC FEET/AC/YEAR		
1. LANDS CLASSIFIED AS UNSUITABLE	12,534 5/	
2. LANDS CLASSIFIED AS SUITABLE		(347) 6/
3. LANDS CLASSIFIED AS A SEPARATE SUITABILITY COMPONENT		0
C. REGENERATION DIFFICULTY	67,489	
D. IRREVERSIBLE DAMAGE	9,860	

4/ Includes only productive, suited lands.

5/ From Forest-wide analysis of lands classified as unproductive forest.

342,653	-total acreage classified as unproductive forest
-316,004	-grassland
- 13,762	-within wilderness
- 6	-within Indian Creek RNA
- 347	-identified as suitable in III.B.2.
12,534	

6/ Although 347 acres were considered to be suitable this was not a large enough acreage to justify creation of a separate suitability component. These acres were returned to the unsuited base.

Table E-3 (Cont)
LAND SUITABILITY FOR TIMBER MANAGEMENT

	NOT SUITED FOR TIMBER PRODUCTION	SUITED FOR TIMBER PRODUCTION
IV. TENTATIVELY SUITABLE FOREST LAND		1,090,072
V. TOTALS OF SUITABLE AND NONSUITABLE LANDS	1,259,143 7/8/	1,090,072
VI. SUITABLE LAND SUMMARY APPROVED FOR FOREST PLANNING PRIOR TO REGULATIONS OF 9/30/82 AND THE CHIEF'S LETTER OF 7/15/83.	1,265,760 7/	1,083,485
VII. LAND STATUS UNDER CURRENT TIMBER MANAGEMENT PLAN 9/	828,500	1,395,100

7/ Excluding private lands from I.A.
8/ Includes 347 acres from III.B.2.
9/ From Amendment 8 to the 1962 Wallowa-Whitman Timber Management Plan. These acreages do not include lands in Idaho and do not reflect the effects of P.L. 98-328. Acreages were determined using plot-expansion techniques rather than map measurements.

Appendix F

SEDIMENT COEFFICIENTS

Overview

Sediment yields were estimated for the purpose of comparing the various alternatives. While the techniques used result in actual tons/acre/year estimates of sediment production, the state-of-the-art is such that these values are better used as indices. Consequently, the Environmental Consequences Section of the Draft Environmental Impact Statement displays sediment output by alternative as a percent of natural sediment output rather than through a display of actual output levels.

Determination of Sediment Production From Land Surfaces Other Than Roads

On-site erosion was estimated using the techniques described by Anderson. 1/ In order to arrive at sediment production it was necessary to estimate the amount of eroded soil reaching a stream channel (sediment delivery). 2/

The unit of land used for estimating outputs was the land type. Land types are discussed, in detail, in Appendix B. Sediment coefficients were developed for each land type/activity combination, and were then used in the FORPLAN computer model as a scheduled output.

Table F-1 displays the values used in developing FORPLAN sediment yield tables.

1/ Anderson, David A., Guidelines for Computing Quantified Soil Erosion Hazard and On-Site Soil Erosion. U. S. Department of Agriculture, Forest Service, southwestern Region, October 1969.

2/ U. S. Department of Agriculture, Forest Service, Pacific Southwest Region, Q/D Technical Note No. 1, 1978.

Determination of Sediment Production From Roads

Road construction is often cited as a major cause of erosion and sediment from timber harvest activities. 1/ Estimates for road sediment production were made using a technique developed by Leaf. 2/ These estimates were included, along with nonroad sediment production, in the FORPLAN model as a scheduled output. A record of this analysis is on file at the National Forest Headquarters.

1/ Brown, George W. and James T. Krygier, Clearcut Logging and Sediment Production in the Oregon Coast Range, in Water Resource Research Vol. 7, No. 5, October 1971.

2/ U. S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, A Model for Predicting Erosion and ediment Yield from Secondary Forest Road Construction, Research Note RM-274, December 1974.

Table F-1
ESTIMATION OF SEDIMENT PRODUCTION

Land Type	Cover Type 1/	Basic Erosion Rate 2/	Baseline Erosion Rate (Tons/Ac/Yr) 2/	Sediment Delivery Coefficient 3/	Baseline Sediment Production (Tons/Ac/Decade) 4/	First Decade Sediment Following Activity (Tons/Acre Treated) 5/ 6/		
						HCC, HSH	HCT	HFR
G2	F	.41	.0363	.05	.0182	.0889	.0386	.0256
	N	.54	.2152	.10	.2152			
G3	F	.41	.0363	.05	.0182	.0889	.0386	.0256
	N	.54	.2152	.10	.2152			
G4	F	.41	.0545	.04	.0218	.1096	.0471	.0322
	N	.54	.3345	.08	.2676			
G5	F	.41	.1101	.05	.0551	.2707	.1162	.0809
	N	.54	.6627	.10	.6627			
S1	F	.54	.2723	.25	.6808	1.2017	.8853	.7644
	N	.65	.7087	.36	2.5513			
S2	F	.41	.1543	.14	.2160	.3775	.2785	.2421
	N	.54	.4306	.22	.8879			
S3	F	.41	.1452	.14	.2033	.3596	.2568	.2293
	N	.54	.4153	.22	.9137			
S4	F	.54	.1089	.24	.2614	.4579	.3328	.2881
	N	.65	.2776	.34	.9438			
S5	F	.54	.1180	.24	.2832	.4975	.3636	.3189
	N	.65	.3022	.34	1.0275			
S2H	F	.41	.1525	.14	.2135	.3761	.2761	.2385
	N	.54	.4306	.22	.9473			
S3H	F	.41	.1736	.19	.3298	.5513	.4264	.3685
	N	.54	.2961	.30	.8883			
S4H	F	.54	.1258	.32	.4026	.7089	.5204	.4497
	N	.65	.3244	.39	1.2652			
S5H	F	.54	.1382	.32	.4422	.7789	.5717	.4941
	N	.65	.3565	.39	1.3904			

1/ F = forested, N = nonforested

2/ Estimated as described in Guidelines for Computing Quantified Soil Erosion Hazard and On-Site Soil Erosion, (Anderson, 1969) assuming soil bulk density of 0.8 qms/cc.

3/ Determined using technique in R-5 Q/D Technical Report No. 1.

4/ Baseline Erosion Rate (Annual) x Sediment Delivery Coefficient x 10.

5/ Values reflect improving ground cover during first decade after activity,
HCC = Clearcut, HSH = Shelterwood Harvest, HCT = Commercial Thinning, HFR = Final Removal
Assumes bare soil percentages following harvest and fuel treatment as follows:
Gentle Land Types: HCC, HSH - 50%, HCT - 30%, HFR - 20%
Steep Land Types: HCC, HSH - 25%, HCT - 15%, HFR - 10%

6/ Activity-related (timber harvest) sediment changes are applied only to forested land types.

Appendix G

WILDLIFE

Management Indicator Species

Background

Regulations published pursuant to the National Forest Management Act of 1976 (36 CFR 219.19(a)(1)) require the identification of management indicator species.

". . . the following categories shall be represented where appropriate: Endangered and threatened plant and animal species identified on State and Federal lists for the planning area; species with special habitat needs that may be influenced significantly by planned management programs; species commonly hunted, fished, or trapped; nongame species of special interest; and additional plant or animal species selected because their population changes are believed to indicate the effects of management activities on other species of selected major biological communities or on water quality."

Endangered or Threatened Species

The bald eagle is a threatened species wintering along the Snake, Burnt, and Grande Ronde Rivers. Only one pair is known to nest on the Forest, though eight pair are assigned to the vicinity of the Wallowa-Whitman National Forest in the August, 1984 Draft of the Pacific Bald Eagle Recovery Plan. 1/

The American peregrine falcon is an endangered species, recently sighted only in Hells Canyon and the Eagle Cap Wilderness. Four pair are assigned northeast Oregon as part of the Pacific States Peregrine Falcon Recovery Plan. 2/

Species Commonly Hunted, Fished, or Trapped

The Rocky Mountain elk is a highly valued game animal and is selected as an indicator of the quality of habitat diversity, the interspersion of cover and forage areas, and the security of cover provided.

1/ Anthony, R. G., et al. Pacific States Bald Eagle Recovery Plan pre-publication draft. U.S. Fish and Wildlife Service, 1984.

2/ U.S. Fish and Wildlife Service. Recovery Plan for Peregrine Falcon (Pacific Population) Fish and Wildlife Reference Service, Unit 1, 3840 York St., Denver, CO. 1982.

Species with Special Habitat Needs

Species/habitat relationships as defined in *Wildlife Habitats in Managed Forests* 1/ were systematically reviewed to identify species having special habitat needs which might be impacted by management.

The following criteria were used to identify the species having special habitat needs:

1. Feeding or reproduction orientations limited to only one or two successional stages of coniferous forest.
2. Restrictive habitat requirements within coniferous forest, other than successional stage.
3. A primary dependency on riparian or moist meadow habitat.

From this review, the following were selected as indicators of coniferous forest, and riparian zone management.

1. Old-Growth Forest

   The pileated woodpecker is the principal indicator species for mature and old-growth forest. Originally identified as an indicator of the availability and distribution of large snags, it became apparent in the development of managed stand yield tables that the managed forest would probably not be expected to provide an adequate food base for this species, even if it could be managed to provide adequate numbers of large snags for nesting.

   The goshawk is considered a supporting indicator of the abundance and distribution of mature and old-growth forests. The goshawk is associated with dense canopied mixed conifer, white fir, and lodgepole pine associations. The Townsend's warbler is also a supporting indicator of the quality of multi-storied mixed conifer, white fir, and subalpine fir habitats.

   The pine marten is an indicator of the quality and distribution of mature and old-growth forest in the mixed conifer, white fir, and subalpine fir associations particularly in the high elevation areas. The pine marten is also indicative of the continuity of cover between these old-growth stands.

   The three-toed woodpecker is an indicator of the abundance and distribution of lodgepole pine and subalpine fir mature and old-growth forest, again often typed to quality of habitat in the higher elevation areas.

1/ USDA Forest Service. Agricultural Handbook No. 552, Washington, D. C. 1979.

2. Snags

Primary cavity excavators as a group are indicators of this habitat. The saw-whet owl is identified on the Wallowa-Whitman as an indicator species of this group for small to medium size snag habitat. The white headed woodpecker is an indicator associated with the distribution of smaller snags within the ponderosa pine and mixed conifer associations.

3. Early Succession - Special Habitats

The Cooper's hawk is associated with dense, young-to-mature, ponderosa pine, mixed conifer, and white fir associations. The sharpshinned hawk is added to this list of indicators because of its preference for thickets of pole, young, or mature coniferous forests.

4. Riparian Zone Management

Anadromous and resident salmonids are indicators of the maintenance and quality of instream habitat. The yellow warbler inhabits medium to tall deciduous trees and shrubs of riparian zones, and is an indicator of the diversity and quality of deciduous riparian habitat.

Minimum Management Requirements

The following pages are excerpted directly from Regional direction November 11, 1983, regarding the development of minimum management requirements for wildlife. The standards relate to a number of the above-mentioned indicator species for the Wallowa-Whitman National Forest. The text is provided in its entirety in order to enable the reader to see how the standards for the Wallowa-Whitman National Forest and adjoining Umatilla and Malheur National Forests relate to standards for other National Forests in Region 6.

Diversity

The National Forest Management Act regulations (36 CFR 219.27(g)) requires that the Forest Service ". . . provide for and maintain diversity of plant and animal communities . . ." Numerous indices are available to make quantified estimates of plant community diversity, and wildlife or plant species diversity. All emphasize abundance and evenness of distribution. That is, diversity is highest when many species or communities are present and all are abundant.

Abundance and evenness of distribution are fairly effective estimators of plant or animal species diversity, if adequate census can be made of all the species occurring in the area. Such census data is not available for the Wallowa-Whitman. Alternatively, wildlife species diversity may be indexed indirectly by plant community diversity.

ADDRESSING MINIMUM MANAGEMENT REQUIREMENTS FOR WILDLIFE AND THREATENED AND ENDANGERED SPECIES

1. IDENTIFY WHICH HABITATS, HABITAT COMPONENTS, AND FEDERALLY-LISTED THREATENED AND ENDANGERED SPECIES MUST BE ADDRESSED.

a. Identify Which Habitats and Habitat Components are Limiting

(1) "Limiting" indicates that without special provision, a habitat or habitat component is subject to reduction below levels necessary to maintain viable populations.

(2) The following will be considered limiting within the Region:

(a) Mature and Old-Growth Conifer

(b) Dead and Defective Trees

(c) Riparian Habitat

(d) Big Game Winter Range

b. Identify Federally-Listed Threatened and Endangered Plant and Animal Species (see accompanying Species Matrix)

2. IDENTIFY KEY VULNERABLE SPECIES WHICH ARE, OR MAY BE, IN JEOPARDY DUE TO POSSIBLE REDUCTIONS IN LIMITING HABITATS

a. "Key vulnerable species" are those with the greatest dependency on limiting habitats

b. Distinguish Among Subregional Zones:

(1) Zone 1--North Coastal Zone (Olympic, Siuslaw)

(2) Zone 2--Westside Cascades Zone (Gifford-Pinchot, Mt. Baker-Snoqualmie, Mt. Hood, Rogue River, Siskiyou, Umpqua, Willamette)

(3) Zone 3--Eastside Cascades Zone (Colville, Deschutes, Fremont, Okanogan, Wenatchee, Winema)

(4) Zone 4--Blue Mountains Zone (Malheur, Ochoco, Umatilla, Wallowa-Whitman)

c. See Accompanying Species Matrix. Forests will address all species listed for their zones unless otherwise indicated in the Species Matrix. Forests may exclude a listed species or add an unlisted species upon submission of a request for such a change, accompanied by a completely documented rationale, and approval by the Regional Forester.

Designated zones encompass a large geographic area, and in a few cases a species listed for the zone will not occur on every Forest. In these cases, the only action needed is for the Forest to document the absence of the species in its planning records.

3. DEFINE HABITAT REQUIREMENTS FOR KEY VULNERABLE SPECIES AND THREATENED AND ENDANGERED SPECIES

a. Principal Habitats Used

(1) Reproducing

(2) Feeding

(3) Cover

b. Dispersal Distance. Where dispersal distances are appropriate they have been listed (see Species Habitat Requirements Tables (Tables 1-21)); however, it will often not be possible to fit a precise distance to existing terrain or vegetative conditions. A variation of plus or minus 20 percent from the listed dispersal distance is considered acceptable.

c. Size of Area to Which Wildlife Prescriptions or Standards and Guidelines Apply.

d. These characteristics will be defined at the Regional level for each species in the Species Matrix for each subregional zone (see Species Habitat Requirements Tables (Tables 1-21)).

4. INCORPORATE HABITAT REQUIREMENTS FOR KEY VULNERABLE SPECIES AND THREATENED AND ENDANGERED SPECIES IN THE ANALYSIS

a. There are a number of available techniques for incorporating habitat requirements into the analysis. Each Forest may find that the use of several techniques would be needed to fully model the wildlife requirements. Those techniques selected should reflect the wildlife data on that Forest as well as the model structure and modeling needs dictated by the integration of all the resources into the analysis. For a discussion of specific techniques see Appendix 4: Techniques for Incorporating Minimum Management Requirements in the Analysis.

b. Habitat requirements must be incorporated in the analysis in some manner. The techniques described in Appendix 4 represent some of the basic ways to accomplish this task. Forests should document the actual techniques used to incorporate management requirements in the analysis. If the identified habitat requirements will not constrain the analysis, they need not be specially provided for; however, there must be a documented rationale presented to substantiate this fact.

c. In providing for limiting habitats, all opportunities should be used to minimize the total acreage allocated for the key vulnerable species. Within constraints established by species dispersal ability and habitat size, this can be partially accomplished by allowing for multiple species habitat occupancy. For example, habitat established for spotted owls may in some cases substitute for part of the total habitat needed by marten, pileated woodpeckers, primary cavity excavators, Roosevelt elk, and black-tailed deer. In addition, areas established to meet other resource needs should be examined for their suitability in meeting key vulnerable species' habitat needs. Habitat allocations should be made from Forest lands unsuitable for timber production whenever the opportunity exists, provided the habitat meets species needs and dispersal distance limits.

SPECIES MATRIX FOR ADDRESSING MINIMUM MANAGEMENT REQUIREMENTS FOR WILDLIFE AND THREATENED AND ENDANGERED SPECIES

ZONE HABITAT	Zone 1 NORTH COASTAL	Zone 2 WESTSIDE CASCADES	Zone 3 EASTSIDE CASCADES	Zone 4 BLUE MOUNTAINS
Mature and Old Growth (Seral stages V & VI)	Northern Spotted Owl Marten Pileated Woodpecker	Northern Spotted Owl Marten Pileated Woodpecker	Northern Spotted Owl Marten Pileated Woodpecker Northern 3-toed Woodpecker Barred Owl (Okanogan, Colville) Goshawk (Fremont, Winema) Woodland Caribou (Colville)	Marten Pileated Woodpecker Northern 3-toed Woodpecker
Dead and Defective	Primary Cavity Excavators	Primary Cavity Excavators	Primary Cavity Excavators	Primary Cavity Excavators
Riparian	Each Forest will determine and document as part of the planning records, whether it needs to address wildlife in addition to fish, and if so, which wildlife species will represent the riparian habitat. Coordination of this process with adjacent Forests is necessary to insure consistency.			
Winter Range	N/A	Roosevelt Elk Black-tailed Deer Mountain Goat (Gifford-Pinchot, Mt. Baker-Snoq.)	N/A	Rocky Mountain Elk
Threatened and Endangered Species	Bald Eagle Peregrine Falcon Oregon Silverspot Butterfly Brown Pelican Aleutian Canada Goose	Bald Eagle Peregrine Falcon McDonald's Rockcress (Siskiyou)	Bald Eagle Peregrine Falcon Grizzly Bear	Bald Eagle Peregrin Falcon McFarlane's 4 o'clock (Wallowa-Whit.)

TABLE 2

WILDLIFE SPECIES HABITAT REQUIREMENTS

SPECIES MARTEN

Principal Habitats Used	Dispersal Distance Between Habitats	Size of Area to Which Wildlife Prescriptions Apply	Habitat Requirements to be Used in Analyses
Zones I and II A. Reproducing Seral stages V and VI of Kuchler types K1, K2, K3, K4, K5, K7, K12, K14, K15, and Lodgepole climax. B. Feeding Seral stages III-VI of Kuchler types listed for Reproducing habitat. Zone III and IV A. Reproducing Seral stages V and VI of Kuchler types K4, K12, K13, K14, K15, and Lodgepole climax. B. Feeding Seral stages III-VI of Kuchler types K4, K11, K12, K13, K14, K15, and Lodgepole climax.	3 miles measured center to center of core reproductive areas.	160 acres per habitat area. (This figure represents the territory of one female and part of the territory for a male.)	Maintain 160 contiguous acres of conifers in seral stages V or VI with a crown closure ≥ 50%. Within the [illegible]60 acre unit: Maintain an average of 2 hard snags per acre ≥ 12 inches d.b.h. Twenty four of these 320 snags should be ≥ 20 inches d.b.h. Maintain a minimum average of 6 down logs per acre ≥ 12 inches d.b.h. and 20 feet long.

Note: See Table 21 for a description of Kuchler Types and Seral Stages.

TABLE 3

WILDLIFE SPECIES HABITAT REQUIREMENTS

SPECIES PILEATED WOODPECKER

Principal Habitats Used	Dispersal Distance Between Habitats	Size of Area to Which Wildlife Prescriptions Apply	Habitat Requirements to be Used in Analyses
Zone I A. Reproducing Seral stages V and VI of Kuchler types K1, K2, K3, K5, K12, and riparian. B. Feeding All seral stages of Kuchler types listed for reproducing habitat, provided snags are present. Zone II A. Reproducing Seral stages V and VI of Kuchler types K1, K2, K3, K5, K29, and riparian. B. Feeding All seral stages of Kuchler types listed for reproducing habitat, provided snags are present. Zone III A. Reproducing Seral stages V and VI of Kuchler types K1, K2, K3, K5, K7, K10, K11, K12, K13, K14, and riparian. B. Feeding All seral stages of Kuchler types listed for reproducing habitat, provided snags are present. Zone IV A. Reproducing Seral stages V and VI of Kuchler types K11, K12, K14, K15, and riparian. B. Feeding All seral stages of Kuchler types listed for reproducing habitat, provided snags are present. Note: See Table 21 for a description of Kuchler Types and Seral Stages.	All Zones 5 miles measured center to center of core reproductive areas.	600 acres per pair	Within a 1,000 acre unit: Maintain 300 acres of conifers in seral stages VI and/or V, per pair for reproducing. Maintain a minimum average of 2 hard snags per acre ≥ 12 inches d.b.h., within the 300 acre reproductive area. Forty two of these 600 snags should be ≥ 20 inches d.b.h. When possible maintain reproductive area in 300 contiguous acres. If not possible, habitat may be arranged in blocks no less than 50 acres and no more than 1/4 mile apart. Maintain a minimum average of 2 hard snags per acre ≥ 10 inches d.b.h., on an additional 300 acres for feeding.

TABLE 8

WILDLIFE SPECIES HABITAT REQUIREMENTS

SPECIES PRIMARY CAVITY EXCAVATORS*

Principal Habitats Used	Dispersal Distance Between Habitats	Size of Area to Which Wildlife Prescriptions Apply	Habitat Requirements to be Used in Analyses
All conifer and broadleaf plant types, provided snags are present.	N/A	Conifer and broadleaf plant types within the Forest.	Provide, at a minimum, sufficient numbers and sizes of hard snags to maintain primary cavity excavators at 20% of their potential population size throughout their present range. Use procedures in "Wildlife Habitats in Managed Forests, the Blue Mountains of Oregon and Washington" for determining numbers and sizes of hard snags.

*Includes all woodpecker species occuring on NF lands in the Region.

TABLE 12

WILDLIFE SPECIES HABITAT REQUIREMENTS

SPECIES ROCKY MOUNTAIN ELK

Principal Habitats Used	Dispersal Distance Between Habitats	Size of Area to Which Wildlife Prescriptions Apply	Habitat Requirements to be Used in Analyses
A. Reproducing - All plant types. B. Feeding - All plant types. Seral stages I and II of conifer types provide optimum forage. C. Cover - Use hiding and thermal cover as defined in "Wildlife Habitats in Managed Forests, the Blue Mountains of Oregon and Washington."	N/A	Entire Winter Range 1. Forage (1) Determine the genetically viable population number $N_e = 500$ using formulas from population biology theory as summarized by Salwasser and Hoekstra, and by Harshman. Herd composition and other population biology factors used in the formulas should b developed assuming no legal hunting o the population. (2) Determine number of days elk wil be on winter range(s). (3) Determine pounds of air dry forage required per elk per day on winter range. (4) Determine total forage needed to maintain a viable elk population as follows: (1) x (2) x (3). 2. Thermal Cover Manage a minimum of 10 percent of the entire winter range(s) as thermal cover.	Winter range thermal cover will, as a minimum and when possible, meet the requirements established for summer thermal cover in "Wildlife Habitats in Managed Forests, the Blue Mountains of Oregon and Washington."

Note: See Table 21 for a description of Kuchler Types and Seral Stages.

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TABLE 13

WILDLIFE SPECIES HABITAT REQUIREMENTS

SPECIES BALD EAGLE

Principal Habitats Used	Dispersal Distance Between Habitats	Size of Area to Which Wildlife Prescriptions Apply	Habitat Requirements to be Used in Analyses
A. Nesting Habitat Seral stages VI and occasionally V of Kuchler types K1, K2, K5, K10, K11, and K12. Use of seral stage V is dependent of presence of large old-growth trees.	variable	variable	Through consultation with the Fish and Wildlife Service, determine acres of suitable occupied and suitable unoccupied habitat. Working in conjunction with the Fish and Wildlife Service and Bald Eagle Recovery Team, determine the acres of habitat needed to be consistent with the population goals of the interim recovery plan.
B. Feeding Habitat Same as nesting, plus Kuchler type K25.			
C. Staging and Roosting Habitat Same as nesting.			

Note: See Table 21 for a description of Kuchler Types and Seral Stages.

TABLE 14

WILDLIFE SPECIES HABITAT REQUIREMENTS

SPECIES PEREGRINE FALCON

Principal Habitats Used	Dispersal Distance Between Habitats	Size of Area to Which Wildlife Prescriptions Apply	Habitat Requirements to be Used in Analyses
A. Nesting Habitat (eyrie) Cliffs, bluffs, and rock outcrops.	variable	320 acres	Delineate nest site and withdraw from mineral entry. Restrict management activities, and recreation use, to September - January. No structural developments should be permitted within the 320 acre nest site.
B. Feeding habitat A variety of habitats are used. Those habitats which produce abundant bird prey species are most commonly hunted.		variable	Maintain and/or enhance riparian habitats within a 3 mile radius of eyrie. Implement silvicultural prescriptions, prescribed fire, or other management techniques to maintain a mosaic of all vegetative seral stages within a 3 miles radius of the nest site. Special emphasis should be directed towards maintaining and/or enhancing mast and berry producing shrubs and trees which support blue jays, bandtail pigeons, and passerine birds.
C. Water Same as for feeding.			Through consultation with the Fish and Wildlife Service, identify historic eyries suitable for reintroduction as part of the recovery program. Apply habitat requirements to those sites.

TABLE 20

WILDLIFE SPECIES HABITAT REQUIREMENTS

SPECIES MCFARLANE'S FOUR O'CLOCK (Listed as Endangered: FR 44:61910, 10/26/79)

Site Description	Management Direction
A. Steep slopes, talus with loose soil, south exposures, 1,000 - 1,50 feet.	A. Survey potential habitats to ascertain distribution of the species in NE Oregon. B. Develop and implement a management plan which will maintain and/or enhance this species pending development of a Recovery Plan by the Fish and Wildlif Service.

TABLE 21

WILDLIFE SPECIES HABITAT REQUIREMENTS

	KUCHLER POTENTIAL VEGETATION TYPES*
K1	SITKA SPRUCE-RED CEDAR-WESTERN HEMLOCK FOREST
K2	RED CEDAR-WESTERN HEMLOCK-DOUGLAS-FIR FOREST
K3	SILVER FIR-DOUGLAS-FIR FOREST
K4	SUBALPINE FIR-MOUNTAIN HEMLOCK FOREST
K5	MIXED CONIFER FOREST
K6	REDWOOD FOREST
K7	RED FIR FOREST
K10	PONDEROSA SHRUB FOREST
K11	WESTERN PONDEROSA FOREST
K12	DOUGLAS-FIR FOREST
K13	RED CEDAR-WESTERN HEMLOCK-WHITE PINE FOREST
K14	GRAND FIR-DOUGLAS-FIR FOREST
K15	ENGELMANN SPRUCE-SUBALPINE FIR FOREST
K24	JUNIPER STEPPE WOODLAND
K25	ALDER-ASH FOREST
K26	OREGON OAKWOODS
K29	CALIFORNIA MIXED EVERGREEN FOREST
K34	MONTANE CHAPARRAL
K37	MOUNTAIN MAHOGANY OAK SCRUB
K40	SALTBUSH-GREASEWOOD
K49	TULE MARSHES
K50	FESCUE-WHEATGRASS
K52	ALPINE MEADOWS AND BARREN
K55	SAGEBRUSH STEPPE

SUCCESSIONAL STAGES

SERAL STAGE	DESCRIPTION
I..............	GRASS-FORB
II.............	SHRUB-SEEDLING
III............	POLE-SAPLING
IV.............	YOUNG CONIFER
V..............	MATURE CONIFER
VI.............	OLD-GROWTH CONIFER

*Kuchler, A.W. 1964. Manual to accompany the map potential natural vegetation of the Conterminous United States, Amer. Geographical Soc., Special Pub. No. 36 (152p) (2nd ed. Rev. map 1975) N.Y.

REGIONAL DIRECTION FOR ADDRESSING THE MAINTENANCE OF VIABLE POPULATIONS OF FISH

Summary: 36 CFR 219.19 requires that fish and wildlife habitat be managed to maintain viable populations of existing native and desired nonnative vertebrate species in the planning area. Special provisions to ensure viable populations of fish need not be developed, however, since in most cases required compliance with the Clean Water Act (through the use of Best Management Practices) will maintain existing levels of fish habitat capability, which are sufficient to sustain viable populations of the various species of anadromous and resident fish.

Rationale: In addressing the maintenance of viable populations, we make the assumption that existing stream and lake habitat conditions are capable of supporting viable populations of resident fish. For waters that support anadromous fish, we have, based on cooperative analysis with the Oregon Department of Fish and Wildlife and the Washington Department of Fisheries, determined that freshwater habitat for anadromous fish (spawning and rearing habitat) is sufficient to support viable populations in most Forest watersheds. Most Columbia River drainages, however, do not support viable populations, since the last two decades have seen a marked decline in adult escapement, generating a smolt escapement far below what the rearing habitat is capable of producing. The restrictive elements that limit adult and smolt escapement are harvest, migration barriers, and insufficient flow to pass smolts at the hydroelectric installations on the main stem rivers such as the Columbia and Snake Rivers. Most coastal drainages appear to be supporting viable populations of anadromous fish, although in some situations insufficient adult escapement is occurring or insufficient spawning habitat exists.

As a result of the external factors limiting adult and smolt escapement of anadromous fish, it is not appropriate to define Forest Service responsibilities for maintaining viable populations of fish in terms of actual populations. We can, however, assign smolt habitat capability values for anadromous fish habitat. We can also index the capability of the habitat to sustain resident fish. By using habitat capability to address viable populations of fish, we can address that area of fishery management for which we are responsible. Moreover, we are better able to monitor changes in habitat capability that result from our land use activities than we are able to determine changes in fish population numbers. Viable fish populations for Forest planning, therefore, will be addressed through habitat capability.

We have disaggregated fish habitat into two components--structural and nonstructural. Structural habitat consists of streambank vegetation (shade), streambanks, and substrate. When combined they form the shape of the stream channel (stream channel morphology). Nonstructural habitat consists of stream temperature, sediment (suspended and bedload), and water chemistry, and is directly influenced by the condition of, and alteration to, the structural component. Nonstructural components such as stream temperature and suspended sediment are influenced by changes in the amount of streamside vegetation, which in turn, influences the stability of streambanks. Mine wastes and other point sources of pollution are reflected in water chemistry.

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These components of fish habitat are protected as a result of actions taken to meet the requirements of the Clean Water Act. In order to assure compliance with Statewide Water Quality Management Plans, developed under the Clean Water Act, the Forest Service has entered into Memoranda of Understanding with the Oregon Department of Environmental Quality and the Washington Department of Ecology to delineate the responsibilities and activities required to implement the State Plans on lands administered by the Forest Service. Attachment A of the Memoranda of Understanding is the Implementation Plan for Water Quality Planning on National Forest lands in the Pacific Northwest. Basically this Implementation Plan relies on the identification of "Best Management Practices" (BMP's) as a means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals.

BMP's are basically a preventive rather than enforcement system. BMP's make use of management and planning systems as a basis for addressing sound water quality goals. BMP's may be applied on either a site specific or broad basis utilizing existing water quality as a reference level that is used in comparing the resulting predicted water quality with the water quality goals. The Pacific Northwest Region's Streamside Management Unit (SMU) Policy (FSM 2526, R-6 Supplement 42, 9/80), is a key component of the Best Management Practices designed to meet water quality goals. It establishes four classes of streams based on the use made of the water, and prescribes the water quality management goals for each class of stream. The broad management goal for all streams is to apply Best Management Practices consistent with achieving specific water quality goals, and to protect the stream and adjacent area so as to maintain the aquatic resources at high natural levels.

When Best Management Practices are met, primarily through the management of the structural components of habitat, the fish habitat capability will not be degraded to a level significantly lower than the existing habitat capability. Given the earlier discussed assumptions about existing habitat capability being sufficient to support viable populations, this maintenance of existing habitat capability levels ensures a capability to maintain viable fish populations.

Note: See Region 6 I.D. No. 6, FSM 1922.33, # 3, for direction on addressing particular levels of fish habitat capability in the development of Forest Plan alternatives.

TECHNIQUES FOR INCORPORATING MINIMUM MANAGEMENT REQUIREMENTS IN THE ANALYSIS

The initial development of Benchmarks and Alternatives is accomplished through the use of the FORPLAN linear programming model. Some Minimum Management Requirements can be easily incorporated in the analysis, e.g., FORPLAN is specifically designed to address most of the timber requirements. Meeting other requirements, especially for nontimber resources, must be done by finding ways to approximate or simulate the action of those requirements in the FORPLAN model, particularly with respect to their interaction with timber management practices. If such incorporation inside FORPLAN is not possible or appropriate, adjustments must be made to the FORPLAN model solution to account for those requirements.

In light of the design of the general FORPLAN model, and the differing conditions, quality of information, and planning problems on individual Forests, there is no single best way to incorporate the nontimber resource Minimum Management Requirements in the analysis. Consequently, there is no Regional requirement that these nontimber Minimum Management Requirements be incorporated in the analysis in only one way. The Region has, however, identified a list of some of the basic techniques which are appropriate for addressing these requirements. (See below) Forests must meet the requirements using one or more of these (or other) techniques--whatever is/are most appropriate given a Forest's particular conditions, strategies, and model formulation.

Consistency in meeting Minimum Management Requirements within the Region will be fostered through a common identification of the Minimum Management Requirements themselves, and through the guidelines used in interpreting and applying the requirements (the second column of the Minimum Management Requirements matrix).

Forests should document, in the planning process records, the actual techniques used to incorporate Minimum Management Requirements in the analysis. If certain requirements will not constrain the analysis, they need not be specially provided for; however, there must be a documented rationale presented to substantiate this fact.

Techniques For Incorporating Minimum Management Requirements in the Analysis:

(1) Allocate a specific prescription to a specified area - might be used when a specific location is needed, such as Spotted Owl Management Areas (SOMAs) or winter range for elk.

(2) Allocate a specific prescription to a given acreage within a general area - used in two possible circumstances:

(a) When the given acreage must be broken up and distributed across the general area in small parcels such as meadows; or

(b) When a Forest lacks the geographic detail in its model, it may be forced to allocate part of the more general area, such as 8,000 acres set aside for SOMA's on a Ranger District.

(3) Schedule a particular output or activity on a general area - an output that might be scheduled is pounds of forage. The constraint could be assigned to require a set number of pounds for a decade or decades on the entire Forest or on some geographic subunit (this capability depends upon model structure). An activity which could be scheduled is acres clearcut.

(4) Control the acreage of a particular habitat - this might be an inventory constraint which requires a set number of acres of conifer with an age of between 85 and 175 to be present in all decades. This inventory constraint would satisfy the requirements for mature confier.

(5) Use management prescription standards and guidelines (which are then reflected in yield tables, etc.) - an example would be the snag requirement. The prescription would require the land manager to leave a given number of snags per acre and the timber yield tables would be adjusted to reflect that volume loss.

(6) Make adjustments outside FORPLAN.

(a) Modeling - instead of modeling Forest production inside FORPLAN, auxilary models or satellite programs can be developed which use the results of FORPLAN runs as input for additional analyses--an example would be taking the acres reported by FORPLAN as being clearcut and reviewing them as forage seeding opportunities; the actual forage production level can then be calculated using a satellite program that takes into account the natural forage level plus the forage produced when part, or all, the forage seeding opportunities are utilized.

(b) Nonmodeling - additional analyses made without the use of a quantitative model, including, where appropriate, evaluations based on professional judgment.

Plant community diversity is assumed to be highest when all successional stages of many community types are well represented. This diversity can be documented through summation of acreage by community type and successional stage. These summations must be carefully evaluated because they do not consider the important spatial distributions of successional stages and community types across the landscape.

Diversity was indexed by measuring the evenness of distribution of successional stages among the different working groups and land classes. The five successional stages (age classes in decades) were: 1) shrub-seedling (age class 0); 2) pole-sapling (age classes 1-3); 3) young (age classes 4-7); 4) mature (age classes 8-15); and 5) old (age classes 16+). These successional stages are described in Wildlife Habitats in Managed Forests. 1/ Working groups are CD, CW, LP, and CD-B. The land classes are G (gentle), S (steep), and H (long span - helicopter) (see - Appendix J for description of working groups and land classes).

The evenness of distribution was evaluated through application of the evenness of distribution index found in Odum. 2/ Two alteratives (Alternative C and Alternative B-departure) were fully evaluated using this diversity index. The index proved largely ineffective in displaying significant differences between these alternatives. Several things contributed to this:

1. Age class data in FORPLAN are necessarily very generalized and are therefore "lumpy". This results in a relatively low initial diversity index value as a starting point in all alternatives. It results in an apparent increase in diversity in all alternatives which is more dramatic than what would be expected on the ground.

2. The age structure of the Wallowa-Whitman National Forest is currently dominated by relatively mature stands which if graphed would very crudely resemble an inverted pyramid. This age class distribution in all alternatives tends to right itself so that the pyramid has a broad base in the young age classes and a limited distribution in the old-age classes.

1/ Thomas, Jack W. and Others. Wildlife Habitats in Managed Forests of the Blue Mountains of Oregon and Washington. Agriculture Handbook No. 553. Portland, OR: U. S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station: 1979.

2/ Odum, Eugene P. Fundamentals of Ecology. W. B. Saunders Company, Philadelphia, PA. 1971.

3. Because all of the successional stages are weighted equally in assessing the diversity under this evenness of distribution concept, the diversity index does not reflect differences in loss of old-growth well. This may not adequately account for the fact that many species associated with the mature and old-growth successional stages are habitat specialists and less adaptable than species associated with early successional stages. As a result, species diversity may not be adequately reflected by a strict evenness-of-distribution index.

4. Within the commodity emphasis alternative, reduced diversity associated with the loss of mature successional stages is often compensated for by the increased diversity induced by early successional stages on areas which would not be logged at all in more amenity-oriented alternatives. As discussed above, these early successional stages carry the same weight as mature or old-growth in assessing evenness of distribution, and the diversity index again is not sensitive to the apparent loss of old-growth habitat.

For these reasons, it was decided not to display this diversity index and assess the implications of diversity in more qualitative terms. The calculations from the spreadsheet matrix that were used to derive this evenness of distribution index for Alternative C and Alternative B-departure are on file at the Forest Supervisor's Office in Baker, Oregon.

Big-Game Winter Ranges

Big-game winter ranges, winter ranges for deer and elk, were mapped by Oregon Department of Fish and Wildlife and Idaho Department of Fish and Game biologists, and reviewed by Forest Service District biologists and Rangers. The criterion for mapping big-game winter range was: These ranges represent the area occupied by approximately 90 percent of the elk population from December 1 to April 1, two out of three winters.

The mapping was done on 1" per mile topograpical overlays of orthophoto mosaics of the Ranger Districts. Following the review and minor editing corrections, these winter range maps were approved by the Wallowa-Whitman Forest Supervisor and the Area Manager for the Oregon Department of Fish and Wildlife. Alternatives did not attempt to differentiate between the relative importance of various winter ranges. Rather, they applied varying levels of management intensity to entire areas mapped as winter range.

Habitat Effectiveness Index for Elk

Habitat effectiveness indices for elk were estimated assuming harvest of existing mature tree stands at the maximum rate allowed by the harvest dispersion constraints within Strategies 1, 2, and 3. As a result, these indices tend to overestimate the impacts of timber harvest on elk habitat to the degree that other younger successional stages or uneconomic lands are interspersed with these mature stands. These indices, however, assume no treatment of adjoining mature stands. The indices, therefore, underestimate impacts to the degree that the lack of specific cover distribution objectives allows quality of cover to be compromised through salvage or overwood removal programs in Strategies 1 and 2. Overall, they appear to be fairly reasonable estimators of habitat effectiveness.

In developing these habitat effectiveness indices, recent data of Leckenby 1/ regarding the utilization of different classes of cover were incorporated as suggested by Jack Ward Thomas (personal communication). That is, thermal cover was assigned the weight of 1.0 to reflect the disproportionately heavy use of these areas; hiding cover was assigned a value of 0.5 to reflect lack of substantial use of that cover. Table 1, below, summarizes the habitat effectiveness indices for the principle Forest management strategies on the Wallowa-Whitman National Forest. These indices include cover forage ratios, assessment of quality of cover, and a discounting for roads. The geometric mean of these factors is used as suggested by Jack Ward Thomas (personal communication) to incorporate the "compensatory function".

The habitat indices were calculated for the managed portions of the Wallowa-Whitman National Forest which would vary between alternatives. It was assumed that habitat in Hells Canyon National Recreation Area would not be altered substantially enough to result in changes on the elk herds. Thus, for several game management units, in Hells Canyon NRA and in the Eagle Cap Wilderness, little change in habitat was anticipated.

In translating habitat effectiveness indices to Forest-wide estimates of elk habitat effectiveness indexed by elk numbers, it was assumed that those management units that are dominantly in Hells Canyon NRA, or Eagle Cap Wilderness would be little affected for the foreseeable future. Therefore, approximately 8,000 elk were projected to retain static populations while the elk numbers on the remaining Forest (approximately 14,000 elk) were projected to vary over time in direct proportion to changes in the habitat effectiveness index. This assumption tended to dampen the variation in the Forest-wide habitat effectiveness indices, but appropriately reflects the fact that much of the elk habitat in those areas will be little affected by management. Spreadsheets incorporating these assumptions are available for review in the Forest Supervisor's office in Baker, Oregon.

1/ Leckenby, Donavin A. Elk Use and Availability of Cover and Forage Habitat Components in the Blue Mountains, Northeast Oregon, 1976-1982. Wildlife Research Report Number 14, Oregon Dept. of Fish and Wildlife, Portland, OR. 1984.

Appendix H

POTENTIAL RESEARCH NATURAL AREAS

Following are recently identified potential research natural areas on the Forest and the principal ecologic cells represented in each. 1/ Figure H-1 shows the approximate location of each area.

Table H-1
AREA DESCRIPTIONS

Map Key	Name of Area	Approximate Acreage	Cells Represented
A	Indian Creek 2/	990	Mountain hemlock
B	Lightning Creek	2,000	Idaho fescue-bluebunch wheatgrass Idaho fescue/prairie junegrass Idaho fescue/Hood's sedge
C	Pleasant Valley	1,400	Sand dropseed Bluebunch wheatgrass/ prickly pear Bluebunch wheatgrass/ snow buckwheat Idaho fescue/prairie Junegrass Slenderbush buckwheat Smooth sumac/bluebunch wheatgrass Red three-awn Snowberry-rose Low elevation stream Ninebark-ocean spray shrublands Douglas-fir/ninebark

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1/ Two additional areas are being considered for addition to this potential research natural area list. These represent tufted hairgrass and hackberry cells. Their suitability has not been determined.
2/ Existing RNA

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Table H-1 (continued)
AREA DESCRIPTIONS

Map Key	Name of Area	Approximate Acreage	Cells Represented
D	Bill's Creek	30	Sand dropseed Red three-awn Hackberry
E	Alum Beds	600	Snake River greenbush rims Low elevation stream Hydrothermal community
F	Little Granite	5,700	Subalpine fir/grouse huckleberry Douglas-fir/ponderosa pine/snowberry Spruce-subalpine fir/false huckleberry Snake River greenbush rims Low elevation stream Mid-elevation stream High elevation stream Ponderosa pine/blue bunch wheat-grass
G	Boner Flat	1,700	Ponderosa pine/Idaho fescue Green fescue/Parry's rush Subalpine fir-whitebark pine
H	Craig Mountain Lake	100	High elevation permanent pond and meadow
I	West Razz Pond and West Half of Razz Lake	30	High elevation permanent pond Black sedge meadow High elevation stream
J	Mount Joseph	700	Tundra (cushion-plant communities) Whitebark pine communities

Table H-1 (continued)
AREA DESCRIPTIONS

Map Key	Name of Area	Approximate Acreage	Cells Represented
K	Duck Lake	500	Low elevation permanent pond Low elevation vernal pond Old-growth ponderosa pine Douglas-fir/pinegrass White fir/big huckleberry
L	Vance Knoll	500	Biscuit scabland Sandberg's bluegrass/ one-spike oatgrass
M	Government Draw	200	Stiff sagebrush/ Sandberg's bluegrass
N	Glacier Lake	100	High elevation lake, arctic willow

There are several additional plant communities in need of representation in the Blue Mountains. To date no candidate research natural areas have been identified for them. The communities are as follows:

Western juniper/stiff sagebrush

Ponderosa pine/bunchgrass

Ponderosa pine/bitterbrush/bunchgrass

Grand fir/beargrass

Subalpine fir/false huckleberry

Lodgepole pine/grouse huckleberry/pinegrass

Idaho fescue/Hood's sedge

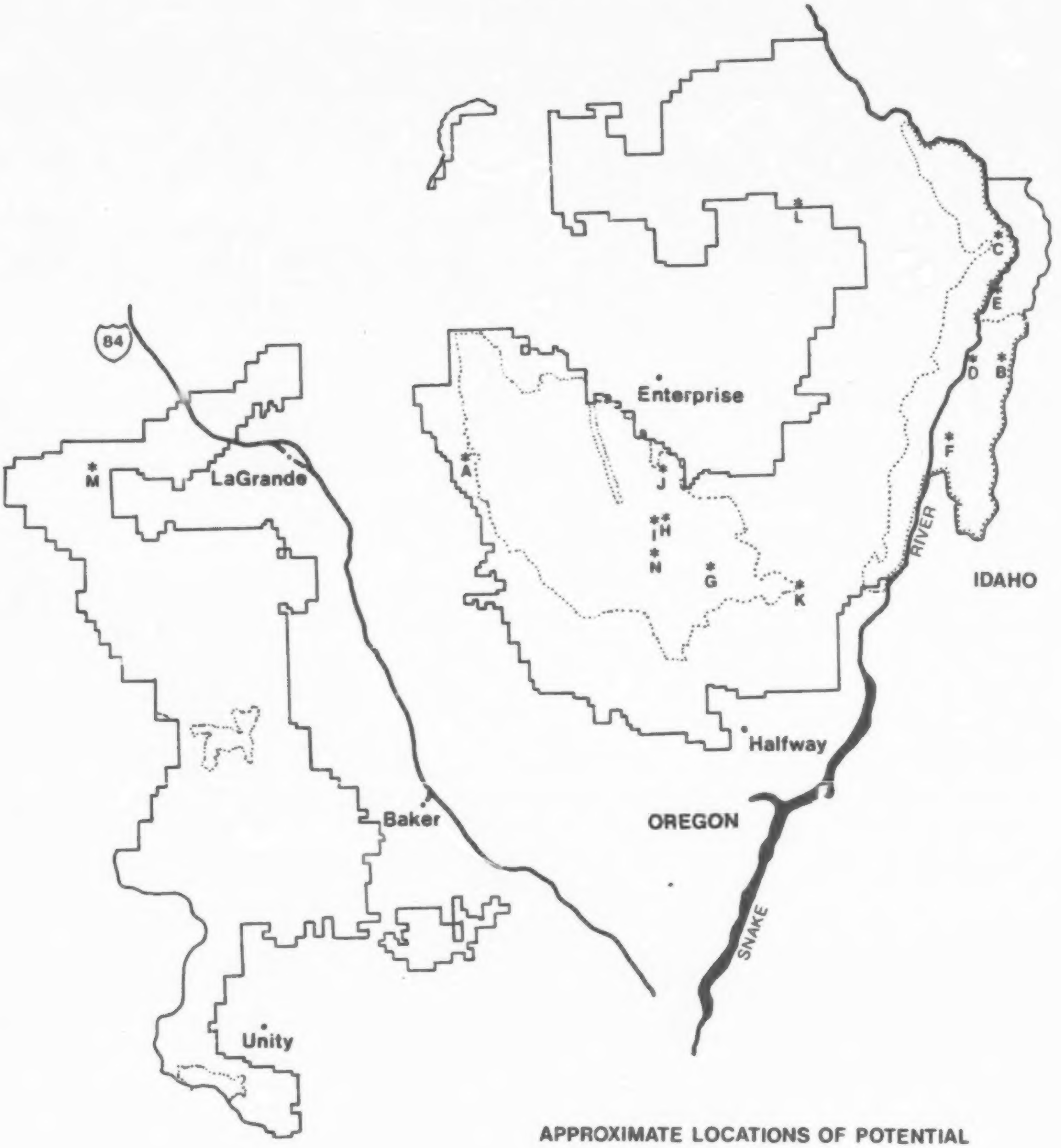
Basin big sagebrush/bunchgrass

Bitterbrush/bluebunch wheatgrass

Low elevation lake

Western redcedar/Devil's club

Figure H-1


84
L
C
E
D
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Enterprise
M
LaGrande
A
J
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H
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K
F
RIVER
IDAHO
Halfway
Baker
OREGON
SNAKE
Unity

APPROXIMATE LOCATIONS OF POTENTIAL RESEARCH NATURAL AREAS

LEGEND

A	Indian Creek (existing RNA)
B — N	Potential RNA
....	Wilderness boundary

6/85 L.D.H.

Table H-2
POTENTIAL RESEARCH NATURAL AREAS
(Summary of Resource Conflicts)

Map Key	Area	Wildlife	Minerals	Livestock Grazing	Timber	Recreation	Water
A	Indian Creek 1/	N	N	L	M	N	N
B	Lightning Creek	N	N	M	N	N	N
C	Pleasant Valley	L	N	H	N	N	N
D	Bill's Creek	N	N	M	N	N	N
E	Alum Beds	N	N	L	N	L	N
F	Little Granite	N	N	L	N	L	N
G	Boner Flat	N	N	M	N	N	N
H	Craig Mtn. Lake	N	N	N	N	L	N
I	West Razz Lake & Pond	N	N	N	N	L	N
J	Mount Joseph	N	N	N	N	N	N
K	Duck Lake	N	N	L	L	L	N
L	Vance Knoll	N	N	L	N	N	N
M	Government Draw	N	N	N	M	N	N
N	Glacier Lake	N	N	N	N	L	N

Legend

N = No significant conflict
L = Possible conflicts but easily mitigated with little resource tradeoff
M = Definite conflicts which can be mitigated with moderate resource tradeoff
H = Conflicts which can be mitigated with difficulty and/or significant resource trade-off

1/ Existing

Narrative Description

A.	Indian Creek	Currently established research natural area. Grazing capacity of approximately 40 AUM's livestock (sheep) can be easily routed around the area if needed for protection. Contains some 901 acres of commercial forest land with approximately 2.6 MMBF standing timber volume.
B.	Lightning Creek	Lies in current domestic sheep grazing allotment and produces 80 AUM's. Contains two mining claims that could become active and if so, would have to be provided for. No apparent recreation use that could not be accommodated within the research natural area.
C.	Pleasant Valley	Grazing capacity of about 120 AUM's is currently used by domestic sheep. Contains two sheep campsites which would probably have to be eliminated if the RNA were established. A stock driveway through the area would be necessary. Popular elk hunting area. Current relatively heavy elk use would apparently not be compatible with an RNA. No serious recreation conflicts are apparent.
D.	Bill's Creek	Located in a bench 100 feet in elevation above the Snake River. This small area currently provides approximately six AUM's grazing for domestic sheep. A recreation and livestock trail passes through the area. Conflicts would arise only if sheep were permitted to "camp" in the area.
E.	Alum Beds	Boundary could be set back from river shoreline so conflict with boating public would be negligible. Placing lower boundary above the Snake River Trail would avoid grazing conflict if the RNA were to be confined specifically to the immediate vicinity of the Alum Bed outcrop.
F.	Little Granite	Area not presently grazed by livestock or planned for domestic grazing, but contains potential of 200 AUM's which could be effectively used by sheep. Upper portion is popular recreation area and this use could continue to be accommodated within the RNA concept. Popular trails traverse the area.
G.	Boner Flat	Grazing capacity is approximately 280 AUM's. Grazing conflicts could be greatly reduced if northern half of the area were removed from consideration. No other conflicts foreseen.

H.	Craig Mtn. Lake	Recreation use now low and there is no intent to encourage a higher rate of use through wilderness planning. Conflicts are unlikely unless recreation use were to substantially increase, which is unlikely due to the obscure location of the lake.
I.	West Razz Pond and West Half of Razz Lake	Similar situation to that of Craig Mtn. Lake. The portion of Razz Lake that is included in the proposed RNA does not include the east end of the lake which receives relatively heavy visitor use.
J.	Mount Joseph	Area excluded from grazing and, other than recreation livestock use, it is unlikely to be included in a grazing allotment in the future. No apparent conflicts foreseen.
K.	Duck Lake	Although this lake receives considerable recreation use, it appears that such use would not be incompatible with the research natural area if the campground area were excluded. It provides approximately 80 AUM's of forage. The boundary of the area can be adjusted to avoid conflicts with sheep grazing although a driveway may have to be provided through a portion of the area.
L.	Vance Knoll	Livestock grazing capacity of approximately 100 AUM's would be eliminated from the capacity of the grazing allotment. Best examples of the desired cells lie on private land. A part of the RNA establishment would be an attempt to acquire this private land parcel and include it with the larger piece of National Forest land.
M.	Government Draw	Contains approximately 1.5 MMBF of timber on 150 acres of commercial forest land. No recent use by livestock and not currently within a grazing allotment. Area contains several on-going studies by scientists from the PNW Range and Wildlife Habitat Laboratory in La Grande.
N.	Glacier Lake	No apparent conflicts. The proposal is to include only the west half of the lake which receives minor recreation use.

Appendix I

POTENTIAL WILD AND SCENIC RIVERS

Following are detailed descriptions of streams or portions of eligible streams which are being considered candidates for inclusion in the Wild and Scenic River System.

Lostine River

Originating in the Eagle Cap Wilderness in the Wallowa Mountains at the north end of Minam Lake, the Lostine River flows north northwest four miles through the wilderness, and another 11 miles through the Forest to Pole Bridge picnic area, six miles south of the town of Lostine. Eventually it enters the Wallowa River after crossing 13 miles of private land.

A. General Setting and Description

1. Total miles of river: 28

2. Total miles, National Forest: 15 (four of which are totally within the Eagle Cap Wilderness); a half-mile through private land.

3. Total acres included in quarter-mile corridor on each side of river: 4800. Wilderness acres, 3040; acres currently in dispersed recreation land allocation, 1760.

4. The river flows entirely in Wallowa County, Oregon, between T. 4 S., R. 44 E., W.M., and T. 2 S., R. 43 E., W.M., Section 15.

5. The 11 miles of stream corridor constitute a "peninsula" into the Eagle Cap Wilderness, the boundary of which lies a quarter to half mile to the east of the stream. The 1984 Oregon Wilderness Act extended the wilderness boundary to the centerline of the stream on the west.

   This small river canyon's primary significance is as an important recreation area, and serves as buffer and access to the Eagle Cap Wilderness. A gravel road parallels the stream, and a number of developed recreation sites are in the canyon.

6. This stream is being considered for wild, scenic, or recreational status as a result of the Phase I inventory done by the Heritage Conservation and Recreation Service, now a part of the National Park System.

B. Eligibility Determination

This section of river has the following attributes and minimum eligibility:

The stream is free of impoundments; the shoreline has a gravel road parallel to the stream for approximately ten miles. The drainage area of the stream is almost entirely within the wilderness; waters are unpolluted.

Minimum eligibility: Wild river status where river lies totally within the wilderness; recreational river status downstream due to the paralleling road and recreational developments.

C. Description

1. The walls of the deep, glaciated, steep-sided canyon tower from two to three thousand feet over the river visitor. Canyon walls are a variety of shape and color provided by vegetation and rock outcrops. In their nationwide rivers inventory, the National Park Service notes that the Lostine River is an "exceptionally clear, straight stream flowing through an excellent example of glaciated U-shaped valley". Falling some 3200' from its origin to where it leaves the Forest, it tumbles rapidly nearly the entire distance -- with numerous rapids and small waterfalls. Upon leaving the Forest, it travels through agricultural lands where the primary use is for irrigation.

2. The road parallels the stream for about ten miles. Wilderness trailhead is near the stream at the wilderness boundary, and a well-used trail follows the stream through the wilderness.

3. This portion of the Lostine is easily accessible from State Highway 82 through the town of Lostine and on Forest Road 8210, which parallels the stream.

4. In air miles, this stream is 63 miles from Walla Walla, Washington; 256 miles from Portland, Oregon; 77 from Lewiston, Idaho; 34 from La Grande, Oregon; and less than five from Enterprise, Oregon.

5. Long recognized for its recreational value and use, this river corridor has four well-used recreation sites on its banks: Pole Bridge and French Camp picnic areas; Williamson and Shady campgrounds; and Lillyville and Two Pan trailheads. Too small to be suited for rafting or boating, the stream is widely used for streambank fishing. Recreation visitor days for 1984 for Williamson, Shady and Pole Bridge totalled 12,400 --- indicating heavy usage throughout the canyon. Motorcyclists, hunters, fishermen, wilderness users, cross-country skiers, snowmobilers, picnickers, campers, horseback riders all find the canyon attractive and accessible.

6. The portion of the stream outside the wilderness is within the dispersed recreation (motorized) land allocation of the Management Plan for the Wallowa Valley Planning Unit of this Forest.

7. Current uses of this stream and stream corridor are primarily for recreation. The stream crosses 160 acres of the Lapover Ranch, a large holding made up of old patented mining claims. This private holding is three miles downstream from the wilderness boundary. Four summer homes, with their own spring water development, are on this old ranch.

   Potential uses are expected to remain the same.

D. Water Resource

1. The stream averages 175 cubic feet per second flow.

2. Downstream uses outside of the Forest boundary are primarily for local irrigation; within the Forest boundary, primary usage is as a recreational fishery.

3. The only current or potential hydroelectric project listed for the Lostine River in the National Hydroelectric Power Study (U.S. Army Corps of Engineers, 1981) is at Cold Springs, a mile down-stream from Williamson Forest Camp outside the Forest Boundary. Hydroelectric potential is judged fair to good, because of the gradient.

4. Water quality is excellent, draining from the Eagle Cap Wilderness.

E. Wildlife and Fish

1. Steelhead and chinook salmon use this stream for spawning; the Oregon Department of Fish and Wildlife stocks the Lostine rather heavily with trout, and there is a small native population of rainbow trout.

2. No known threatened or endangered plant or animal species exist in this stream corridor or in the stream. A goshawk nesting area is near one of the campgrounds.

3. Except for some soil compaction in and around the four campgrounds, the riparian habitat is good. As with all rivers originating within the Forest, the riparian habitat is considered important to the area and to the region. Each spring, as is typical of the steep, unstable canyon walls in the Wallowa Mountains, minor slides can be expected to affect some of the riparian areas.

F. Recreation

1. Opportunities for primitive and semi-primitive recreation uses except boating and rafting are abundant in this canyon. The opportunity for solitude is not high, because of the proximity to the road and to the campgrounds. The river corridor presents a

good access point to the Eagle Cap Wilderness. Excellent winter sports opportunities exist in this canyon even in years of exceptionally heavy snowfall because the nearby State highway is kept plowed.

2. Future recreation uses are judged to be similar to current uses, with growing emphasis on winter cross-country skiing and snowmobiling as the sports become more popular.

G. **Minerals, Energy**

1. Available information indicates an area of ten patented lode claims, constituting the Contact Mine, on the east side of the Lostine above the Lapover Ranch. This molybdenum mine, discovered in 1906-1907, is at 8700', accessed by several miles of trail over rough and steep slopes. According to the Oregon Metal Mines Handbook, "The quantity of molybdenite exposed in places warrants further development."

2. Several other prospects exist along the stream, but have not been developed.

H. **Timber**

1. Having long been recognized for its primary recreation value, the trees along the stream have not been considered in calculating the timber harvest level for the Forest.

2. Aerial detection flights from 1974 to 1984 showed the presence of scattered mountain pine beetle infestations in lodgepole pine in the stream valley.

I. **Historic/Cultural**

French Camp, which is now a picnic area, is an old CCC work camp and kitchen site. Several Indian burial sites are also within the canyon.

J. **Transportation**

It is anticipated that existing Forest Road 8210 will remain the only transportation route through this river corridor.

K. **Grazing**

The Lostine Canyon is not currently within a grazing allotment, nor is future livestock grazing planned. Formerly, when large sheep herds grazed at higher elevations, they were driven through this canyon. A herd of bighorn sheep winters to the northeast, about a mile outside the Forest boundary, and have been sighted in the upper canyon.

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North Powder River

The North Powder River originates from several springs and small lakes on the east side of Columbia Hill, a peak in the Elkhorn Range. It originates only two miles from the point of origin of the North Fork of the John Day River, but is on the east side of the Elkhorn Divide. It runs northeast to where it leaves the Forest some six miles from the point of origin. Thereafter it remains on private land, joining the Powder River seven miles west of the town of North Powder.

A. General Setting and Description

1. Total miles of river: 13
2. Total miles, National Forest: 6; private, none.
3. Acres included in quarter-mile corridor on each side of river, National Forest: 1920; private: none.
4. This stream originates in T.8 S., R.37 E., Section 8. It leaves the Forest at T.7 S., R. 38 E., Section 30.
5. The significance of this small stream is its proximity to several communities, as an unpolluted water source for the heavily used Powder River system, and its picturesque glaciated valley easily accessible to the public. The streambottom and most of the river corridor are heavily forested. To the north, Twin Mountain appears to tower over the stream corridor, and Red Mountain dominates the southern flank of the canyon.
6. This stream was not inventoried by the National Park Service. It is being considered for wild, scenic or recreation status in this planning phase at the suggestion of the Oregon Natural Resources Council.

B. Eligibility Determination

This section of river has the following attributes and minimum eligibility:

Within the National Forest boundary, the stream is free of impoundment and waters are unpolluted. An historic wheel track road follows the stream. Unobtrusive stumps, evidence of historic mining and nearby ranching development are scattered along the streambottom. Evidence of fuelwood cutting in the lower portion of the area is also noticeable, but for the most part, the corridor retains a primitive appearance. Minimum eligibility for this stream is judged to be wild, scenic or recreation.

C. Description

1. The stream originates at 7200' and is at 4300' at the point it leaves the Forest. The gradient provides many small waterfalls and rapids. Forest Road 7301 was once a stage route from North Powder to the mining town of Bourne.

2. The stream is easily accessed by a number of roads that cross the west side of the Baker Valley, particularly the Muddy Creek Road.

3. In air miles, the origin of the creek is 222 miles from Portland, Oregon; 87 miles from Ontario, Oregon; and 20 miles from Baker, Oregon. The stream leaves the Forest only a few miles from the rural communities of Wingville, Haines, and Pine Creek.

4. There are no recreational uses in the small stream itself, except for occasional fishing. Because of its proximity to the Baker Valley, it is a popular area for picnicking, woodcutting and autumn bow or rifle hunting. No data is available on recreation visitor days.

5. In the Burnt Powder Unit Land Management Plan (1979), this stream and surrounding area are part of the dispersed recreation (motorized) land allocation.

D. Water Resource

1. The small stream has a mean annual flow of 12 cubic feet per second.

2. No known water uses exist on this stream except for its contribution of water to the Powder River System. A reservoir has been proposed on the North Powder, immediately downstream from the Forest boundary. The Soil Conservation Service, in conjunction with Baker Valley Irrigation District, has made plans for the reservoir and is now gathering information for a cost/benefit study.

3. Hydroelectric potential is judged to be low except in high spring runoff. Future possibilities could include a small peak runoff hydro plant similar to that existing on Rock Creek to the south of the North Powder. No known applications for hydro projects exist.

4. Water quality is unusually high.

E. Wildlife and Fish

1. This stream is not an anadromous fishery, but supports a small population of native trout.

2. No known sighting of endangered animals or plants exist in the drainage, although the old-growth forest in the drainage provides excellent habitat for old-growth dependent species.

3. Riparian habitat is generally good; some areas of soil compaction exist from past mining and woodcutting activities. As for all streams which originate on this Forest, the riparian habitat is considered important to the area and to the region.

F. Recreation

1. Recreation opportunities exist for picnicking, hiking, viewing remains of old mining activities, hunting. The end of the four-wheel drive road serves as a trailhead to a number of Forest trails in the Elkhorn Loop trail system. Opportunity for solitude is fairly high. The steepness of the canyon precludes much winter activity, although the area is close to roads kept plowed in winter. In the high runoff of spring, the stream cannot be forded in many locations.

2. Future demand for recreation in the area will likely remain the same as currently, depending on population growth in the Baker Valley.

G. Minerals, Energy

1. Much of the Elkhorn Mountains is considered mineralized to a certain extent, but the North Powder drainage is not considered to be a pocket of intense mineralization, as exists around Bourne to the south. Remains of old mining activity is evident in the drainage, mainly from pre-1930's residual placer mining for copper and molybdenum.

2. The upper fourth of the drainage, between Meadow and Summit Lakes, is part of a large block of non-patented claims controlled by the Manville Company. Exploration is currently underway for low-grade gold ores and other locatable minerals. There is no known oil, gas or geothermal potential on this portion of the North Powder.

H. Timber

1. No programmed harvest is planned within this drainage. In the lower portions of the canyon are old-growth lodgepole, Engelmann spruce, Douglas-fir, white fir. Subalpine fir is dominant in the upper reaches of the canyon; wooded areas are interspersed with small meadows. Volume is judged to be 12 to 14 MBF per acre.

2. Mountain pine beetle has killed much of the lodgepole in the drainage along the creek. Spruce budworm infestations are active in the stands of spruce, white fir and Douglas-fir.

I. Historic/Cultural

Rich in history, this area has a number of pre-1930's mining and ranching sites. The wheel track which parallels the stream is of historic value, being the old stage route to early-day mining camps higher in the Elkhorn Mountains.

J. **Transportation**

No plans exist for raising the standard of the road. It is not near any current or future main transportation routes. The road will likely remain as it is today for the foreseeable future.

K. **Grazing**

No Forest range allotment exists in the drainage, nor are there future plans for including the watershed in an allotment. It is an old sheep driveway, extensively used when large herds of sheep were driven to higher country in past years.

Grande Ronde River

This portion of the large Grande Ronde drainage flows north northeast through National Forest land from two miles north of the settlement of Rondowa to a half mile downstream from the mouth of Grossman Creek, a distance of 18 miles. In this part of the river, it forms the boundary between the Umatilla and Wallowa Whitman National Forests. Of the 18 miles, slightly more than one mile is currently owned by the Boise Cascade Corporation.

A. **General Setting and Description**

1. Total miles of river, this study area: 18

2. Total miles, National Forest: 16.8; private: 1.2

3. Acres included in quarter-mile corridor on each side of river, National Forest: 5376; private: 384.

4. The primary significance of this river is as anadromous fish habitat. Through the cooperative efforts of State and Federal agencies, the private sector and Indian tribes, restoration of anadromous fish runs are becoming a reality. These efforts include upstream salmon hatcheries, spawning habitat improvements and measures to resolve smolt escapement problems at downstream dams on the Snake River.

   The portion under discussion is 2200 feet in elevation near Rondowa (T.3 N., R.40 E., Section 14), and is 1840 feet where it leaves the Forest boundary (T.4 N., R.41 E., Section 1). The major part of the 18-mile stretch is in Wallowa County, with several miles in Union County. The river meanders through this section, with an average gradient of 0.4 percent, and an average width of 70 feet. The canyon walls bordering the river are dominated by rim rock with intervening slopes covered with grass or scattered stringers of timber.

In the National Park Service inventory, it is described as "a long, high-volume river flowing through steep canyons of volcanic rocks. Excellent examples of gooseneck meanders. Supports high quality recreational kayaking and rafting during spring runoff. Still accessible to anadromous fish -- potential steelhead and salmon resource."

5. This river is being considered for wild, scenic or recreational status as a result of the Phase I inventory done by the Heritage Conservation and Recreation Service, now a part of the National Park System.

   In 1984 the Oregon Transportation Commission considered adding the Grande Ronde to the State Scenic Waterways System. The portion under consideration was 42 miles long, from the mouth of the Wallowa River to the Washington State line, including the 18 miles under discussion here. They concluded the Grande Ronde should not be given scenic status. In 1985 a bill to grant State scenic waterways status died in the Oregon legislature. In each case vigorous opposition apparently influenced the discussions. There was fear that restrictions would curtail private rights, restrict timber harvest and cause economic hardships. Primary concerns were with the area north (downstream) of the National Forests which is largely in private ownership. The Oregon Transportation Commission at its February 26, 1985 meeting voted three to one to not proceed with designation. No further action on this study is planned by the Department. Although the State's river study indicated the Grande Ronde River "met or exceeded the qualifications for an Oregon Scenic Waterway", the Commission voted against scenic river designation. However, proponents and most opponents at the State's public hearings indicated favor for designation of this particular 18 miles as State scenic waterway.

B. Eligibility Determination

This section of river has the following attributes and minimum eligibility:

The river is free of impoundment, with a shoreline essentially primitive. It is inaccessible except by river craft or hiking.

Minimum eligibility: wild

C. Description

1. The river is varied with some rapids, many meanders and gentle gradient. Boaters and rafters feel the canyon is extremely scenic, with steep canyon walls, timbered hillsides and talus slopes. The forested areas are also varied, with some areas of scattered ponderosa pine and some north slopes timbered with Douglas-fir, white fir and Englemann spruce.

From the State of Oregon study: "The scenic quality from the river, as well as from the adjacent land, is spectacular. The views are enhanced by dramatic cliffs and rock walls, and an abundant variety of trees, shrubs, and grasses. The character and shape of the canyon seem to change as a boater or hiker move through it."

2. The beginning of this part of the river is accessible by a gravel county road to Rondowa, then a wheel track to the Forest boundary. No roads exist through this study portion. Common access by the numerous rafters and boaters is by the Wallowa River, entering at Minam, eight miles south of where the Wallowa enters the Grande Ronde. The next nearest roaded access is a gravel road near Powwatka, six miles downriver from where the Grande Ronde leaves the National Forest.

4. In air miles, this portion of the Grande Ronde is 227 miles from Portland, Oregon; 34 miles from Walla Walla, Washington; 52 miles from Pendleton, Oregon; Tri Cities, Washington, 84 miles; and 34 miles northeast of La Grande, Oregon.

5. The river is heavily used for fishing and for boating, rafting, kayaking and canoeing. It provides over 7,000 recreation visitor days use per year, 5,000 of which are by the boaters.

6. This area is managed by the Umatilla National Forest under the direction of that Forest's Scenic Recreation Land Allocation, the objective of which is the protection of the outstanding natural landscape. Visual quality objectives for this area are preservation and retention.

7. The primary uses of the river in this study portion are as anadromous fish habitat and for water-related recreation, and as a water source to the Snake River system.

D. **Water Resource**

1. During the last 38 years, maximum average daily flows in March through June were 10,780 CFS. The annual average daily flow downstream at Troy was 3,125 CFS. The highest recorded flow on the Grande Ronde was 42,200 CFS in the flooding of December, 1964. At the Rondowa Gauging Station, average annual flow for 54 years of record equals 1,550,000 acre-feet. Summer and fall average is 282,100 acre-feet; winter average is 362,700 acre-feet, and the spring runoff average is 905,200 acre-feet. (Peak flow generally occurs in May.)

2. A number of upstream and downstream uses exist, mainly fish habitat improvements and irrigation withdrawals. Since a major portion of upstream river flows through private lands, detailed information about the various uses is not available to this description. The nearest reservoir is located at river mile 124, the

Lower Granite Dam on the Snake River. The Seattle City Light Company has a power withdrawal on the entire segment for a project proposed at river mile 4.5. Minimum instream flow requirements for fish is 300 CFS.

3. The combination of heavy annual flow and suitable dam sites indicates that the river has hydroelectric potential. A Federal Energy Regulatory Commission application for preliminary permit (P-6754) has been made for hydroelectric study of a site between river miles 76 and 77 in Section 36, T.4 N., R. 40E. During the next three years, the applicant intends to study the feasibility of construction of a 100-foot earthen dam and power generating facility necessary for the anticipated power production of 81.5 million KWH.

4. Water quality: The Grande Ronde river originates in the Blue Mountains above La Grande, with water quality very high until it flows into and across the Grande Ronde Valley. Flowing as it does through 50 miles of agricultural lands before re-entering National Forest land, water quality in this 18-mile portion is not as high as it is on the west side of the valley.

E. Wildlife and Fish

1. No anadromous spawning takes place in this stretch of the Grande Ronde, although several thousand smolts overwinter here before migrating to the ocean. Adults use this stretch of the river for passage to upstream spawning areas.

   This part also supports a native population of trout and fishing is considered very good. Wild legal trout production is estimated at 5,070.

2. Known sightings of threatened, endangered or rare animal species include: bald eagle, peregrine falcon, and western spotted frog. The Oregon Department of Fish and Wildlife has classified the entire lower Grande Ronde and Wallowa canyons below Minam as critical winter range for elk, deer, mountain sheep and bald eagles.

   Habitat for a number of State of Oregon listed threatened, endangered or rare plants exists in the river area, and the likelihood of these areas containing State-listed plants is fairly high, although no known sightings are recorded.

3. Riparian habitat: In this study portion of the river, riparian habitat is excellent. Some soil compaction exists near the camping locations along the river. The riparian habitat along this 18-mile stretch is considered to be very important to the area and the region.

F. Recreation

1. Opportunities for recreation are primarily water-oriented: boating, rafting, canoeing, kayaking, fishing. Opportunities for solitude are plentiful. In spring and early summer, the river is judged to be excellent for moderately difficult rafting. In late summer, families use this river for introducing children to the pleasures of boating and rafting. Because of the lower elevation of this portion of the river, it is open and accessible late into the fall season. Two primitive campgrounds are within this 18-mile section: Clear Creek and Bear Creek.

   Dependence on the river for annual recreation use (RVD by activity) is as follows: boating, 5,500; swimming, 200; fishing, 400; camping, 600; hunting, 500; sightseeing, 100.

   A commercial shuttle service exists at Minam, where rafters enter the Wallowa River to float the Grande Ronde. A number of commercial rafting concerns have special use permits to conduct trips on the river.

2. Future demand is likely to increase if population increases in northeast Oregon and southeast Washington, and as fisheries habitat improvements continue. Usage is heavy by people from Walla Walla and the Tri-Cities in Washington. Each year the demand for relatively accessible rafting rivers increases.

G. Minerals, Energy

1. There is no evidence of locatable minerals in the canyon, nor is there history of mining activity.

2. This portion of the Grande Ronde is within a newly-discovered lignite coal field in northern Wallowa County, extending into the State of Washington. This structural depression, known as the Troy Basin, covers hundreds of square miles. Lignite seams, averaging 27 feet thick, are not visible in the canyon itself, but underlay the entire area. This portion of the river also lies within an area considered prospectively valuable for oil and gas exploration. There are several oil and gas lease applications, covering 3,000 acres within this area, which have been filed with the Bureau of Land Management.

H. Timber

1. On the Wallowa-Whitman side of the river corridor, standing timber volume is estimated to be 9 MMBF. Potential yield and programmed harvest are judged to be .112 MMBF. Under the present management plan, the timber is not considered suitable for management.

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2. Spotty infestations of spruce budworm and pine bark beetle have been found in this area. There is a long-range potential of spread to adjacent managed stands, but this is of minor importance at this time.

I. Historic/Cultural

Native Americans were active along the Grande Ronde and Wallowa Rivers over many years. From the State's study: The Native Americans "that are now called the Umatillas and Nez Perce were closely related in earlier times and had many shared hunting, fishing and gathering areas, one of which was the lower canyons of the Grande Ronde and Wallowa Rivers." A major Indian trail passes through the study area, from the vicinity of Troy upstream to Rondowa, then up the Wallowa River to Minam and thence to the Wallowa Valley.

J. Transportation

No roads exist in this river corridor and there are no plans for building roads into this area. The primary use of this river area is recreation; the uniqueness of the area is its accessibility only by river; the average slope of the canyon walls is greater than 60%; total standing timber volume on the adjacent canyon slopes is low, and a road within the area would not be cost-effective.

K. Grazing

Present grazing use is minor. The Wallowa-Whitman National Forest side of the river is not within any allotment and is too steep for future use. On the Umatilla National Forest side, the Eden C & H Allotment extends from the Forest boundary upstream for four miles. The season begins late on the allotment and only minor use is made along the river because the forage has dried. The remaining miles have no grazing usage.

Potential: The area would make suitable early season sheep range, which is in short supply. However, possible conflicts with deer winter use may prevent this allocation.

Eagle Creek

Eagle Creek originates at Eagle Lake in the Eagle Cap Wilderness and runs southwest four miles to where it leaves the wilderness. Thence it continues southwesterly approximately six miles to where it turns southeast, eventually leaving the Forest and entering the Powder River near the town of Richland.

A. General Setting and Description

1. Total miles of river in this description: 31.

2. Total miles, National Forest: 25.5; private, 5.5.

3. Acres included in quarter-mile corridor on each side of river, National Forest, 8160; private within Forest boundary, 1760.

4. The river originates in Union county, T.5 S., R.44 E., Section 16. It leaves Union county in Section 36, and flows through Baker County, leaving the Forest at T.8 S., R.45 E., W.M., Section 7.

5. Eagle Lake, origin of Eagle Creek, is 7440'. Elevation of Eagle Creek as it leaves the Forest is 2800'. It flows another nine miles through private agricultural land and joins the Powder River about two miles south of the community of Richland.

   The significance of Eagle Creek and its tributaries is varied: within the Forest its values are primarily scenic and recreational. Outside the boundary, it serves as an important irrigation source, and as a contributor of water to the Snake River system.

   This stream was not inventoried by the National Park Service. It is being considered for wild, scenic or recreation status in this planning phase at the suggestion of the Oregon Natural Resources Council.

B. **Eligibility Determination**

This section of river has the following attributes and minimum eligibility:

Within the wilderness boundary, there are no impoundments. Three miles upstream from Eagle Forks campground, several old mining diversion ponds are now used for fishing and swimming by private summer home owners. Adjacent to Eagle Creek, these ponds use water from the creek.

A gravel road runs along the stream nearly its entire length outside the wilderness boundary. In some areas the road is immediately beside the stream; in other small sections of the stream the road is a quarter to half-mile away. The headwater drainage of the creek within the wilderness is free of pollution. Outside the wilderness boundary, a number of private summer homes, placer mining claims, and streamside livestock grazing permits exist, causing the water to be somewhat more polluted than in the wilderness.

Outside the Forest boundary, irrigation rights, diversions and ditches use nearly the entire flow in summer, thus significantly changing the downstream character of the stream.

Minimum eligibility: Wild river status within the wilderness area; recreational river status downstream to the Forest boundary due to the paralleling road, recreational developments, mining, and private summer homes.

C. Description

1. Topography and vegetation are varied --- from a high elevation glacial stream rushing through rock-strewn canyons, to a meandering stream flowing through attractive meadows. Stands of large ponderosa pine and high cliffs contribute to its scenic beauty. As typical throughout the Wallowa Mountains, this area is geologically unstable. Freezing/thawing contributes to periodic rockslides along cliffs in the drainage, the most recent one being opposite Boulder Park resort at the wilderness boundary. Occurring in 1983, the substantial slide brought down large amounts of rock and soil from a height of about 1000' --- crossing the stream and coming to rest on the opposite side of the valley.

2. Forest Roads 77, 7755 and 7735 parallel the stream nearly its entire length to the wilderness boundary. In the 5.5 miles the stream does not parallel a road, Trail 1878 follows the stream.

3. Accessibility: The stream is easily accessible throughout its length. The point where Eagle Creek leaves the Forest is only eight miles from State Highway 86 through the rural community of New Bridge. The north end of Forest Road 1755 at Boulder Park Resort (a half mile from the wilderness boundary) is the trailhead for Forest Trail 1922, which follows the creek to Eagle Lake.

4. In air miles, the origin of Eagle Creek is 256 miles from Portland, Oregon; 92 miles from Lewiston, Idaho; 34 miles from Baker, Oregon, and 24 miles northwest of Halfway, Oregon.

5. Heavy recreation use occurs along the stream. Although Eagle Creek does not support an anadromous fishery because of dams on the Snake River, there is a substantial native fish population of Dolly Varden, brook and rainbow trout.

   Eagle Forks and Kettle Creek campgrounds are along the stream, in addition to dozens of popular dispersed camping areas. Boulder Park Resort is at the end of Road 7755, a half mile from the wilderness boundary. The resort has been used since 1952, and is under special use permit through 1986.

   Certain portions of the stream are suitable for small rafts and inner tubes. The streambanks and adjacent areas are popular for wildflower, mushroom and berry enthusiasts. Campgrounds are popular in summer for various recreational uses, and in autumn for big game hunting bases. Winter recreation use has been increasing in recent years.

6. Allocations in the management plan (Burnt Powder Planning Unit, 1979) include the following: downstream from the wilderness boundary, Optimum Wood/Big Game; downstream from private lands, dispersed recreation emphasis with several areas of Old-Growth Forest and Big-Game Winter range management allocations.

7. Uses are as varied as the character of the stream and stream corridor: recreation, timber management, private summer homes, campgrounds, some mining claims, domestic livestock grazing, big-game summer and winter range. Potential uses in the context of a forest stream and stream corridor are numerous because extensive private lands are scattered throughout.

D. **Water Resource**

1. Yield: the mean annual flow of Eagle Creek is 325 cubic feet per second.

2. Outside the wilderness boundary, downstream uses include irrigation, as domestic water source, recreational fishery, placer mining.

3. Two potential or current hydroelectric projects are listed in the National Hydropower Study (U.S. Army Corps of Engineers) as existing at New Bridge, outside the Forest boundary, and on lower Eagle Creek near the Forest boundary. The town of Richland has discussed a hydroelectric installation at the Forest boundary, but plans are not final.

4. Water quality upstream within the wilderness is excellent. Downstream is fair to good. Most water quality impacts come from mining operations in the side drainages of Main Eagle Creek.

E. **Wildlife and Fish**

1. Eagle Creek is known as having a good native population of rainbow trout. The Oregon Department of Fish and Wildlife regularly stocks the stream with rainbow, Dolly Varden and brook trout.

2. No known sightings of threatened, endangered or rare plants or animals exist in the Eagle Creek drainage. Habitat for the bald eagle and peregrine falcon exist, but no nests have been reported.

3. Riparian habitat varies from excellent to good. Some soil compaction exists where the stream is near campgrounds, summer homes and livestock watering locations. As in all streams originating on the Forest, the riparian zone is considered important to the area and to the region. Placer miners also use the streambanks and stream, causing some erosion.

F. **Recreation**

1. Recreation opportunities abound: hunting, fishing, some rafting/floating, some areas where solitude is available, campgrounds, scenic viewing, hiking and other common Forest recreational uses. The variety of the stream itself, of the riparian habitat, and of the topography of the stream corridor is perhaps the most attractive attribute of Eagle Creek.

2. Future demands will likely be for the same types of recreation as exist now, with increased use in future years. Heavier winter recreation use depends primarily on access: whether or not county and Forest access roads are plowed.

G. **Minerals, Energy**

1. Nearly all the private lands along Eagle Creek are old patented placer mining claims. Over a dozen active claims are now being worked, in addition to a number of hobby placers. While there are now no large operations directly within the corridor, a number of small suction dredges and sluice operations are in place. There are numerous old mine tailing piles in evidence along the stream.

2. Mining properties are prevalent throughout the south flanks of the Wallowa Mountains, from which Eagle Creek flows, but the Main Eagle drainage is not as highly mineralized as nearby Cornucopia. There is no recognized geothermal potential in the stream corridor.

H. **Timber**

1. Nearly all the private lands lying along Eagle Creek have been logged in the past, primarily to obtain mine timbers. A number of timber sales have been conducted in the past, some units of which extended to the stream. Currently, the Two Color Timber Sale is under contract. Portions of this sale are along the stream between Cougar Meadows and Two Color Work Camp, about two miles from the wilderness boundary. The Skookum, Bennet, Excelsior, Eagle and Stoddard Timber Sales are planned in the Eagle Creek drainage between 1986 and 1991.

   Considering the Forest average of 8 MBF/acre, this corridor is capable of producing 37.4 MMBF of timber on National Forest System lands outside the wilderness boundary.

2. Small infestations of mountain pine beetle and spruce budworm have been noted in the canyon.

I. **Historic/Cultural**

Many cultural resource sites exist throughout the stream corridor: evidence of old mining activity, ranching, and old Forest Service structures.

One of the most outstanding historic sites near Eagle Creek is the old Sparta mining ditch, hand-dug in 1872 by Chinese work crews. It starts upstream from Tamarack Campground, and is over 35 miles long. (Of historic interest is the fact that Oregon Senator Bob Packwood's grandfather was the designer and project leader for the Sparta ditch.)

One of the earliest hydroelectric power plants in the state was built at the mouth of Dixie Creek, where it enters Eagle Creek. Although nothing remains of the old plant, the site is considered a potentially valuable historic resource.

J. **Transportation**

No new road construction is anticipated along the stream; Forest Road 77 will be re-surfaced within the next few years. Some new roads may be constructed near the corridor in connection with the Excelsior Timber Sale.

K. **Grazing**

Upstream areas of Eagle Creek lie in the currently unfilled Sheep Rock allotment. Downstream, the creek is the boundary between Eagle Valley cattle allotment on the east side and Goose Creek allotment on the west side. Grazing use figures are available only for total pasture units of the allotments, and not simply for the stream corridor, so are not a realistic estimate of use along the stream. The latter two allotments are used from late spring to early autumn. A small allotment, Trouble Gulch, exists where Eagle Creek leaves the Forest.

Joseph Creek

Chesnimnus and Crow Creek combine to form Joseph Creek near the Crow Creek Bridge, 20 miles north of Enterprise. This stream meanders northward through a deep canyon to the Forest boundary, about 20 miles downstream. For the purposes of this description and evaluation, Joseph Creek will be divided into two segments: Segment B from the Crow Creek Bridge to Joseph Creek Ranch (eight miles) and Segment C from Joseph Creek Ranch to the Forest boundary (nine miles).

A. **General Setting and Description**

1. Total miles of river in this description: 20.5

2. Total miles, National Forest: 11.25; private, 9.25.

3. Acres included in quarter-mile corridor on each side of river, National Forest: 3600; private, 3040.

4. Joseph Creek originates in T.3 N., R.45 E., Section 26, and leaves the Forest in T.4 N., R.45 E., Section 6, W.M., in Wallowa County. After leaving the Forest, it flows northeast some 20 miles through Oregon and Washington private agricultural land. It enters the Grande Ronde River a few miles upriver from where the Grande Ronde empties into the Snake.

   The primary significance of Joseph Creek lies in its unique surroundings, both historically and geologically. The creek occupies a canyon that is a prominent example of the rugged canyon country of northeast Oregon. Canyon walls are an alternating mixture of steep open grass slopes with scattered patches of trees and rimrock. The canyon bottom and stream are particularly outstanding examples of a stream meandering through wet meadows. The canyon and stream are named for Chief Joseph, famous Nez Perce Indian tribal leader. (For a more complete description of the historical significance of the stream and canyon, see Joseph Canyon Roadless Area, Appendix C.)

The creek is at 3,250' at its origin and 2,200' where it leaves the Forest. Even though the gradient of the stream itself is rather gentle, the steep canyon walls rise 1,200' to 1,500' on both sides within half a mile of the creek along much of its length.

5. This stream is being considered for wild, scenic or recreation status as a result of a supplement to the Phase I inventory done by the Heritage Conservation and Recreation Service, now a part of the National Park System.

B. Eligibility Determination

This section of stream has the following attributes and minimum eligibility:

The stream is free of impoundment. Segment B has a gravel road paralleling it for about 8 miles and flows mainly through private land. This segment would have a minimum eligibility as recreation status. Segment C (nine miles) has a trail (#1714) along its banks. Minimum eligibility of this segment is as wild, scenic or recreation.

C. Description

1. The origin of Joseph Creek is easily accessible on Forest Road 46, off State Highway 3. Forest Roads 200 and 190 follow the creek to the Joseph Creek Ranch.

2. In air miles, the origin of the creek is 48 miles from Lewiston, Idaho; 53 miles from La Grande, Oregon; 265 miles from Portland, Oregon; and 20 miles north of Enterprise, Oregon.

3. Although a small stream, during spring runoff it provides trout fishing and is an anadromous fish stream. The stream and environs are popular for hiking, horseback riding, big-game hunting. Although developed recreation sites do not exist in the canyon, estimated RVDs are 2,000.

4. The land allocation of this stream corridor is part of the "Quality Hunt, Critical Elk Cover" designation in the Wallowa Valley Land Management Plan (1975).

5. The stream corridor's primary recreational usage is as dispersed camping sites during big-game hunting seasons. Where the stream flows through private land, domestic water and irrigation are primary uses. Potential uses will likely remain the same.

D. **Water Resource**

1. A small stream, the mean annual runoff is 46 cubic feet per second.

2. No known impoundments exist, nor do any hydroelectric projects.

3. The stream is judged to have low hydroelectric potential because of low summer/autumn flow, and gentle gradient. No applications exist for future projects.

4. Water quality is fair to good, flowing as it does through substantially large acreages of fertilized pastures.

E. **Wildlife and Fish**

1. Early season trout fishing is good; the stream supports a sizeable trout population and a small returning steelhead population.

2. Threatened and Endangered Species: This area is seasonal peregrine falcon and wintering bald eagle habitat, with a number of sightings of both species reported. Lewis' woodpecker has been documented as nesting along the deciduous riparian zone of the creek and there have been occurrences of seasonal migratory use by the solitary sandpiper.

3. Riparian habitat condition is considered good except in areas where watering cattle trample the streambank and streambank vegetation. It is considered important to the area and to the region.

F. **Recreation**

1. Recreational opportunities are available for strenuous hiking, some rock climbing, unusual scenic vistas, wildlife viewing, solitude and some rafting or boating during spring runoff, in addition to the usual mix of primitive Forest recreation. Joseph Creek is too small for rafting except during spring high water. At its relative low elevation, winters are milder than in other parts of the Forest, and some winter hiking use is noted. The road to Joseph Creek Ranch is generally kept open year 'round.

   Two outfitter guides under special use permit use the canyon and dispersed hunter camps during fall hunting seasons. These permits are administered by the Walla Walla District of the Umatilla National Forest.

2. Future demand will likely remain similar to what is available currently.

G. Minerals, Energy

1. There is no known history of the mining of locatable metals nor of energy sources. There is no recognized geothermal potential in this area.

2. This portion of Joseph Canyon lies within an area considered prospectively valuable for oil and gas. Leases have existed in the canyon, but are now terminated. No locatable mineral potential is in the canyon.

H. Timber

1. Along National Forest System lands within the Joseph Creek corridor, only 350 acres are judged to be have tree stands appropriate for timber management, with a standing timber volume of 2.5 MMBF. Trees grow only in draws, generally on north-facing slopes. Two timber sales occupy 30% of upper Joseph Canyon, mainly on the higher parts of the steep canyon walls. In some places, logging units come down to the creek. One sale has been sold; it is anticipated that logging will commence in 1986.

2. No known serious insect or disease problems exist within the canyon.

I. Historic/Cultural

This area has a rich prehistoric and historic background. Consult the Joseph Canyon Roadless Area description in Appendix C.

J. Transportation

Current Forest roads and trails will likely remain in current condition and at current standards.

K. Grazing

Parts of several Forest range allotments extend within the canyon, mostly for summer usage. Potential grazing is judged to be similar to the present.

North Fork John Day River

This river originates on the northeast slopes of Columbia Hill, a peak of the Elkhorn Mountain range within the North Fork John Day Wilderness. Two segments of this river will be considered in this description: Segment M, within the wilderness (3.5 miles); and Segment N, the nonwilderness portion of the river which runs between the Peavy Cabin to immediately downstream from the North Fork John Day Campground (seven miles).

A. **General Setting and Description**

1. Total miles of river: 10.5

2. Total miles, National Forest: all

3. Acres included in quarter-mile corridor on each side of river, National Forest: (nonwilderness) 2240; (wilderness) 1120.

4. The river originates in T.8 S., R.36 E., section 13 at 7400 feet elevation. It leaves the Forest boundary in T.7S., R.35 E., section 34, W.M. at 5200' elevation.

   The river's primary significance is as a source of pure water for the important downstream anadromous fishery of the John Day River, and as an anadromous fish spawning area (steelhead and salmon). These species from all other streams that originate on this Forest must pass through eight dams on the Snake or Columbia Rivers, but fish from the John Day River system have only to contend with the lower three dams on the Columbia.

   It is a popular recreation area for dispersed camping, particularly during bow and rifle hunting seasons. This portion of the river has a population of small Dolly Varden, brook and rainbow trout in addition to steelhead and salmon. It is relatively wide and quite shallow.

   This river is being considered for wild, scenic or recreation status as a result of the Phase I inventory done by the Heritage Conservation and Recreation Service, now a part of the National Park System.

B. **Eligibility Determination**

This section of river has the following attributes and minimum eligibility:

These segments are free of impoundments. While the National Park Service's inventory states that this river is a "long undeveloped portion of a major river system. . .still accessible to anadromous fish --- potential steelhead and salmon resource. Highly scenic canyon region", this statement does not pertain to Segment N. Along this portion of the river, a paved road parallels the stream for about five miles. This portion also includes evidence of timber harvest and mining; other Forest roads are visible. These factors make the stream ineligible for wild or scenic status, but it is eligible for recreational status.

Minimum eligibility for Segment M: wild river status within the wilderness area.

C. Description

1. Segment N of the river is accessible by paved Forest Road 73. Segment M of the river is accessible by the same road, then a short gravel road to the Peavy Cabin on the wilderness boundary. Trail 1640 follows the stream to its origin high in the Elkhorn Mountains.

2. At the point the river leaves this Forest, air miles to population centers are: Portland, Oregon, 207; Bend, Oregon, 154; Ontario, Oregon, 84; and John Day, Oregon, 43 miles to the southwest.

3. Dispersed camping during hunting season constitutes nearly 90% of the recreation usage on this portion of the river.

4. Segment M of the river lies within the North Fork John Day Wilderness. Segment N (north bank) is within a timber management area. The wilderness boundary comes to the high water line on the south side of the river to within two miles of the campground.

5. Uses along the immediate river corridor are primarily recreational, with areas of varying intensities of timber management nearby. Potential recreational uses will likely remain the same, with slightly more summer usage because of the newly designated North Fork John Day Wilderness.

D. Water Resource

1. Mean annual flow within the non-wilderness portion is 18 cubic feet per second, not suitable for boating or rafting.

2. Primary use is as fishery habitat and source of unpolluted water for the John Day River system.

3. Hydroelectric potential is minimal, with gentle gradient and low flow. No known applications for hydroelectric projects exist.

4. Water quality in the wilderness segment is excellent; in the non-wilderness segment, the quality is good.

E. Wildlife and Fish

1. No known sightings of threatened, endangered or sensitive animals or plants have occurred in this portion of the river.

2. Riparian habitat is fair to good, with some soil compaction evident in dispersed camping and picnicking areas. This river's riparian habitat is considered important to the immediate area and to the region, as are all riparian zones on this Forest.

F. **Recreation**

1. Recreational opportunities are good for dispersed camping, hunting, and fishing, as well as for wilderness access. Opportunities for solitude are not high, since the paved road runs along the stream, and encounters with campers and picnickers are common.

2. Future demand will rise slightly due to nearby designated wilderness.

G. **Minerals, Energy**

1. Numerous unpatented mining claims exist along this portion of the stream, but none are being intensively worked at this time. Even though this watershed lies within the mineralized Elkhorn Mountains, this particular drainage was extensively glaciated, with any placer gold deposits scoured out. There are no known lode deposits this high in the drainage.

2. There is no history of significant placer gold production on the North Fork until it reaches the Klopp placers, slightly downstream from the North Fork Campground. The segment under discussion has a pending mineral withdrawal request, dating from August 6, 1973, but it has not been acted upon.

H. **Timber**

1. In the winter of 1984-85, the River and Gulch timber sales were conducted along the road and stream. Due to the severe epidemic of mountain pine beetle in the recent past, the intent of these sales was to salvage dead lodgepole pine. There are several clearcut units of these sales that extend to within 100' of the stream.

   The Continental Timber Sale, also a lodgepole salvage sale, was planned but has since been dropped because the sale area has been included in the North Fork John Day Wilderness.

2. The epidemic has now run its course leaving dead trees, tens of thousands of which are down. At the Forest average of 4 MBF per acre for lodgepole, the nonwilderness portion represents 8.96 MMBF which has either been removed, is down, or stands as uncut timber.

I. **Historic/Cultural**

This stretch of the stream is rich in historic and prehistoric cultural resource sites: old cabins, mines, Native American sites. It was an important prehistoric fishing site.

J. Transportation

It is anticipated that existing Forest Road 73 will remain the only transportation route through this segment of the river corridor.

K. Grazing

Part of the area under discussion is in the Indian/Crane sheep and goat range allotment. It is used as a trailing area for about 1000 sheep in late August in alternate years. The sheep are driven from the Anthony Burn over the top of the Elkhorns through to Crane Flat, three miles to the south. This is a "rest rotation" allotment, used every other year.

Potential grazing use is judged to be similar to current use.

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Appendix J

MINERALS

Issues, Concerns, Opportunities

Although limited in areal extent, the surface disruption caused by the extraction of mineral resources sometimes causes a great controversy on the National Forest. Most of the region's income is derived from agriculture and the timber industry. There presently is little industrial base to provide other employment. The considerable undeveloped mineral potential of the region provides a significant employment opportunity.

Concern about the possible environmental damage that could occur from mineral development (particularly open-pit or placer mining) has been repeatedly voiced by the public. Today, mineral developers are confronted with a number of environmental protection laws and must restore the land to a usable form on completion of their operations. Environmental protection is monitored by Federal and State agencies.

The Mining and Minerals Policy Act of 1970 states "... that it is the continuing policy of the Federal Government ... to foster and encourage private enterprise in (1) the development of economically sound and stable domestic mining [and] minerals ... industries, [and] (2) the orderly and economic development of domestic mineral resources [and] reserves ... to help assure satisfaction of industrial [and] security needs...." Many support this position based on a desire to maintain a favorable balance of trade, to provide for the National defense, and to support the local economy. Since the economics of mineral extraction is based almost entirely on external factors, there is little the Forest can do to encourage development other than to keep areas of mineral potential open and to make administrative processing of mineral activities as efficient as possible.

A continuing concern of Forest management is mining law compliance. Occupancy of structures on mining claims provides a case in point. Under existing law, the holder of a valid claim may erect structures necessary for mineral development. However, there have been instances of structures being built and occupied on mining claims and being used for purposes unrelated to mining. Abuses of this sort have been greatly reduced in recent years, and the effort is still underway to correct them.

Mineral resources are frequently located in areas which are valued for timber production, recreation, wildlife, and scenery. The axiom that "gold is where you find it" applies to all other minerals as well. As long as there is a demand for minerals, there will be pressure to explore for and develop them. As a land managing agency, the Forest Service must make sure adequate surface protection measures are included for the extraction of minerals and subsequent reclamation of National Forest land.

Current Situation

Locatable Minerals

Locatable mineral deposits on public domain lands may be prospected for and extracted under the 1872 mining law, as amended and supplemented. Administration of the general mining laws is the responsibility of the Bureau of Land Management, within the Department of the Interior. A 1957 memorandum of understanding between the Bureau of Land Management and Forest Service provides for joint administration of the mining laws on National Forest System lands. Regulations covering surface use of the National Forests under the mining laws were promulgated in 1974 to provide for orderly development of locatable mineral resources and for subsequent reclamation of the land.

This Forest is in the heart of the most productive gold and silver region in the state of Oregon. Other metals including copper, lead, zinc, chrome, mercury, and antimony have also been produced in the Forest vicinity. Table J-1 lists metals and minerals found on the Forest and indicates their potential for development. Table J-2 shows metal production estimates for northeastern Oregon and the general area of the Wallowa-Whitman National Forest (including administered lands on the Idaho side of Hells Canyon). Both lode and placer mines have made substantial contributions to total production figures. At 1983 prices, northeastern Oregon's historic metal production would be worth nearly $1.5 billion. Historical metal production from the vicinity of the Forest would be worth nearly $800 million.

Although mineralization occurs in numerous areas across the Forest, the most productive deposits have been found in pre-Tertiary rocks on the margins of Mesozoic granitic intrusives, including the Bald Mountain batholith, the Wallowa batholith, the Cornucopia stock, and the Vinegar Hill stock. The most productive lode gold mine in the State of Oregon, the Cornucopia Mine, is located 12 miles north of the town of Halfway on the south side of the Wallowa Mountains, on the southeast margin of the Cornucopia stock. The North Pole-Columbia lode at the old townsite of Bourne on the southeastern margin of the Bald Mountain batholith supported several mines. The lode was the largest single gold-producing structure in Oregon.

Most of the mining activity in the area was stopped in 1942 when War Production Board Order L-208 closed all precious metals mines. Increased operating costs and a fixed gold price, together with the substantial expenditures necessary to reactivate mines neglected for several years prevented the reopening of all but a few precious metals mines after the war. Only recently, with the increase in gold and silver prices, has the area reemerged as a focus of mining interest. There are currently thousands of lode and placer claims in the mineral belt of northeast Oregon and western Idaho.

All lands on the National Forest are open to mining except those areas specifically withdrawn from mineral entry. The Wilderness Act of 1964 allowed prospecting for locatable minerals and location of mining claims within wilderness until December 31, 1983. The passage of that date has withdrawn the Eagle Cap Wilderness Area from new mineral entry, and the Oregon Wilderness Act of 1984 has withdrawn considerable additional

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acreage. A total of 965,100 acres of the Forest are now withdrawn for wilderness areas, administration and recreation sites, and roadside zones. Of these, 193,600 are of known mineral potential.

Major withdrawn areas include:

Hells Canyon National Recreation Area	596,400 acres
Eagle Cap Wilderness Area	345,900 acres
Monument Rock Wilderness Area	7,300 acres
North Fork John Day Wilderness -	
Baldy Creek Unit	15,200 acres
North Fork Unit	300 acres
	965,100

Mining claims which predate withdrawal, including those within wilderness, may continue to be worked under the mining laws if they contain a valid discovery of a valuable mineral.

Table J-3 displays evaluation criteria used to delineate and categorize mineralized areas in the Forest vicinity. Figure J-1 shows the mineralized areas identified with this process. New discoveries could change the assessment of potential, as well as identify new areas outside those shown in this assessment.

Leasable Minerals

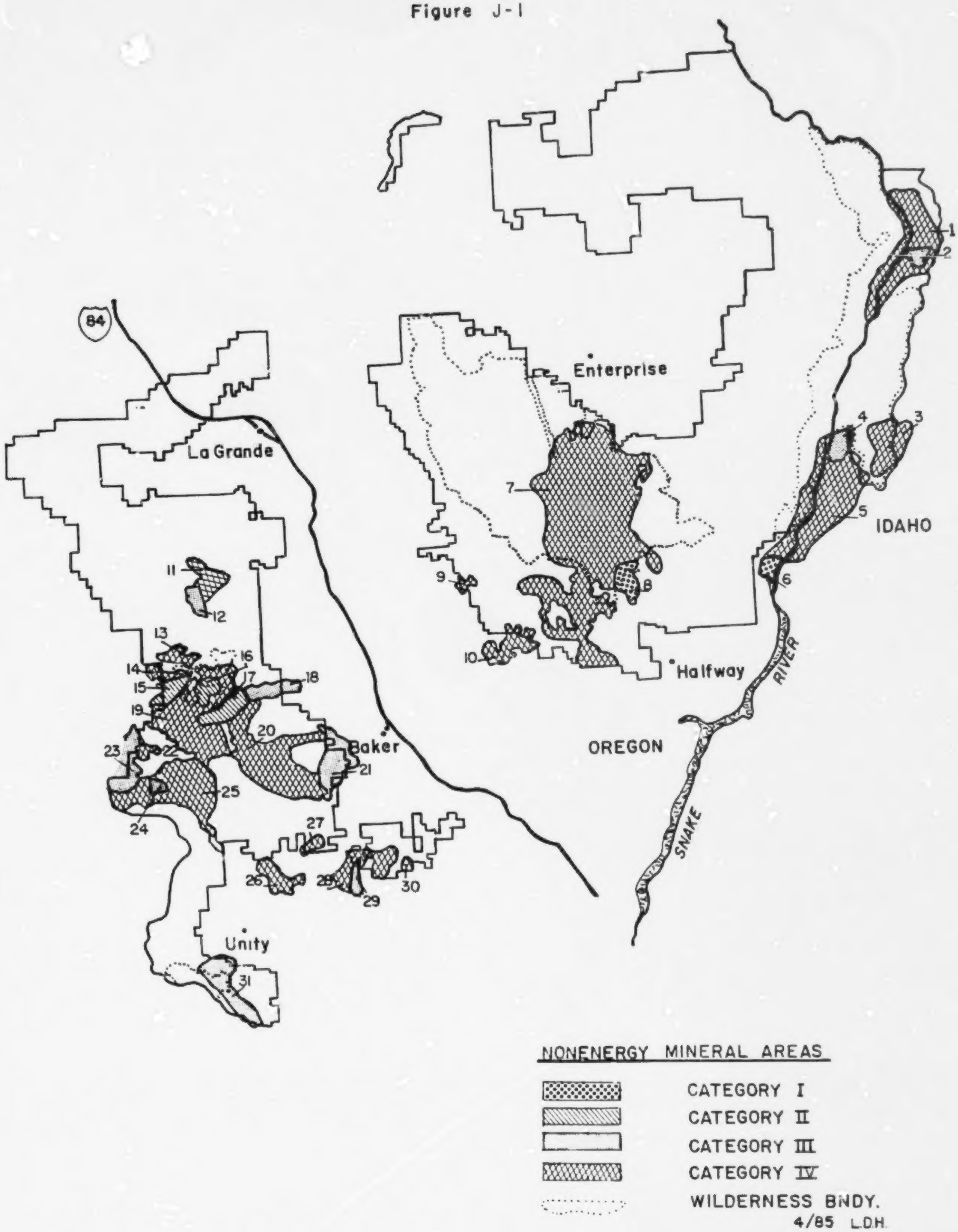
Oil and Gas. The Forest Service has no statutory responsibility to issue leases or permits on lands reserved from the public domain. The Mineral Leasing Act of 1920 reserves this authority for the Secretary of the Interior. However, the Secretary of the Interior generally accepts Forest Service recommendations regarding public domain oil and gas. On acquired National Forest System lands, the Mineral Leasing Act for Acquired Lands of 1947 requires consent by the Secretary of Agriculture prior to leasing of the mineral estate.

The Forest has not historically been considered favorable for oil and gas exploration. Only recently has there been interest in obtaining leases in the vicinity. Recently, leases and lease applications covered a significant part of the Forest, including land outside the area considered favorable by the U. S. Geological Survey (Figure J-2). However, interest in obtaining oil and gas leases has waned considerably, many applications have been withdrawn, and most leases were terminated after one year.

Coal. In respect to coal, the Mineral Leasing Act of 1920 was amended by the Federal Coal Leasing Amendments Act of 1975. Subsequent to that act, a coal exploration license or lease may not be issued without the consent of the surface managing agency, and without a listing of the terms and conditions under which consent is given.

A new, possibly extensive, coal field has been found near the communities of Flora and Paradise in northern Wallowa County. Lignite coal seams occur in tuffaceous lacustrine and fluviatile sedimentary rocks between basalt flows of the Columbia River Group. Most of the coal-bearing strata have been found off Forest land.

Figure J-1


84
La Grande
Enterprise
Halfway
Baker
Unity
OREGON
IDAHO
SNAKE
RIVER
1
2
3
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5
6
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8
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30
31
NONENERGY MINERAL AREAS
CATEGORY I
CATEGORY II
CATEGORY III
CATEGORY IV
WILDERNESS BNDY.
4/85 L.D.H.

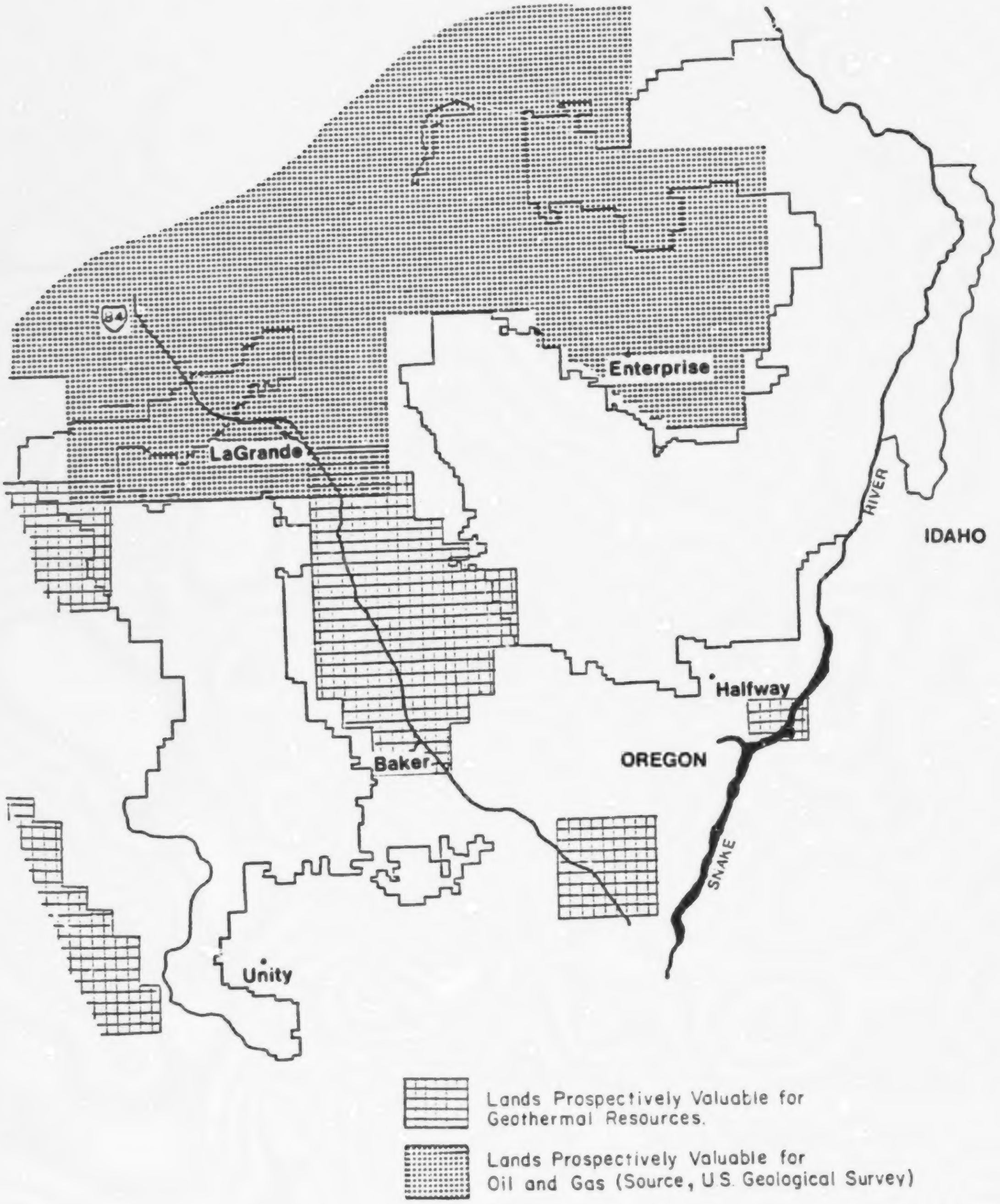

Figure J-2

LANDS PROSPECTIVELY VALUABLE FOR GEOTHERMAL, OIL, AND GAS RESOURCES

84
Enterprise
LaGrande
IDAHO
RIVER
Halfway
OREGON
Baker
SNAKE
Unity
Lands Prospectively Valuable for Geothermal Resources.
Lands Prospectively Valuable for Oil and Gas (Source, U.S. Geological Survey)

A large program of exploratory drilling, sampling, analysis, and geologic mapping needs to be done before any assessment can be made as to the feasibility of extracting the coal. Given a marketable deposit, environmental concerns of aquifer disruption and loss of topsoil productivity would still have to be addressed.

Geothermal. Although a few hot springs are known to occur in and near the Forest, there does not presently appear to be a high potential for geothermal resource development. There currently are no geothermal leases or lease applications within Forest boundaries. The U.S. Geological Survey considers some lands prospectively valuable for geothermal resources in the vicinity, some of which overlap the Forest boundaries (Figure J-2). Should an interest in geothermal exploration develop, the Geothermal Steam Act of 1970 requires that geothermal leasing on National Forest System lands be subject to the consent of, and conditions prescribed by, the Secretary of Agriculture.

Mineral Materials

The Forest Service may dispose of obviously common varieties of mineral materials such as cinders, building stone used for construction purposes, river rock, and rock or sand to be used for aggregate or road construction.

Sand, gravel, crushed rock, building stone, and limestone occur within the Forest boundaries. These are all low-unit-value materials which must be near transportation routes, and usually the point of consumption, to be utilized. A continuing need for some quantities of these materials can be anticipated, with increased demand during periods of growth. The region has a history of producing large amounts of cement, but there are no operations on National Forest land at present.

Management Direction

Within the existing framework of the law, current management direction appears adequate, though action could be taken to better inform the public as to the rights of claim and lease holders, and of the benefits of mineral extraction. However, this might increase the level of tension between those who advocate more mineral development and those who advocate less.

It would be beneficial to better educate the public about the positive aspects of mining and to help counter the horror stories of past operations. As a land managing agency, the Forest Service is open to public scrutiny for administration of surface resource protection laws and under direction to keep land open to mineral exploration as much as possible.

Table J-1
MINERALS AND METALS FOUND ON THE WALLOWA-WHITMAN FOREST

Mineral or Metal	Net Import Reliance	Major Foreign Source	Status on Forest
Manganese	98%	South Africa, Gabon, Brazil, France	Past test shipments, small potential
Chromium	90%	South Africa, USSR, Zimbabwe, Turkey, Philippines	Known occurrences, small potential
Cobalt	90%	Zaire, Belgium, Luxembourg, Zambia, Finland, Canada	Occurrence known
Platinum Group	89%	South Africa, USSR, United Kingdom	Minor placer by-product
Asbestos	85%	Canada, South Africa	Known occurrence, small potential
Mercury	62%	Algeria, Spain, Italy, Canada, Yugoslavia	Few prospects, small potential
Zinc	62%	Canada, Mexico, Honduras, Spain	Production by-product from precious metals mining
Tungsten	59%	Canada, Bolivia, Rep. of Korea	Numerous prospects, small past production
Gold	56%	Canada, USSR, Switzerland	Over 3.5 million ounces produced in NE Oregon, much from W-W, considerable future potential
Silver	45%	Canada, Mexico, Peru, United Kingdom	Over 5 million ounces produced in NE Oregon, much from W-W, considerable future potential
Antimony	43%	South Africa, China, Mexico, Bolivia	Small past production, limited potential
Vanadium	25%	South Africa, Chile, USSR	Minor occurrence in gold-quartz veins, insignificant potential

Table J-1 (Cont.)
MINERALS AND METALS FOUND ON THE WALLOWA-WHITMAN FOREST

Mineral or Metal	Net Import Reliance	Major Foreign Source	Status on Forest
Copper	13%	Canada, Chile, Zambia, Peru	Nearly 10,000 tons produced in NE Oregon, most from W-W vicinity, limited potential
Cement	10%	Canada, Mexico, Bahamas	Past production, future potential
Lead	8%	Canada, Peru, Mexico, Honduras, Australia	Production by-product from precious metals mining
Molybdenum	Net Export		Numerous occurrences significant future potential

Table J-2
AREA MINERAL PRODUCTION

Total Production from Northeastern Oregon

3,526,300 oz. gold
5,111,900 oz. silver
18,940,000 lb. copper
312,000 lb. lead
41,000 lb. zinc
20,000 lt. chrome ore
122 fl. mercury
Value at 1983 prices*: $1,484.2 billion

Total Production in the Vicinity of the Wallowa-Whitman National Forest and Administered Areas in Idaho

1,853,500 oz. gold
3,754,200 oz. silver
18,712,000 lb. copper
312,000 lb. lead
41,000 lb. zinc
3 fl. mercury
Value at 1983 prices*: $798.8 million

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*1983 Prices

Gold $399.72/oz. (Handy and Harman Average)
Silver: $11.45/oz. (Handy and Harman Average)
Copper: 79.3¢/lb.
Lead: 21.67¢/lb.
Zinc: 41.38¢/lb.
Mercury: $322.44/flask
Chrome ore: $50.00/long ton

Table J-3
EVALUATION CRITERIA FOR NONENERGY MINERALS

CATEGORY	I	II	III	IV	V
1. Potential for Substantial Development/ Production Within Ten Years	High	Moderately high	Moderate	Low	Very low based on current knowledge.
2. Current Activity Level	Production or development in progress or pending investment decision.	Comprehensive exploration, development likely. May include some small scale production.	Exploration programs which may include sampling, geochemical and geophysical surveys, geologic mapping, reconnaissance drilling. May include some hobby-size producers.	Sporadic exploration with occasional isolated intense programs by companies or prospectors.	Occasional interest by prospectors.
3. Land Position	Long-term maintenance of claims by established mineral companies/ individuals.	Long-term.	Intermittent by established mineral companies/individuals, long-term by prospectors.	Short-term by established companies/ individuals. Intermittent by prospectors.	Sporadic
4. Geology	Known and favorable for development of significant ore deposits.	Known and considered favorable from comparison with other producing districts.	Not well known, but appears to have favorable characteristics.	Not well known, some favorable characteristics.	Either unknown or unfavorable.
5. Reserve/Resource	Ore reserves established. Will sustain significant production.	Presence of, or strong potential for, substantial resource. May include small reserves.	Potential for large resource is unknown. Small resources, possibly some very small pockets of reserves.	Some mineral occurrences, but not enough information to establish resources.	Unknown.

* Includes all areas not in other categories.

Descriptions

The following descriptions apply to areas delineated on Figure J-1. Area boundaries were drawn on the basis of information gathered from the references at the end of the text. Factors taken into consideration include the geology, historical production information, available sample data, and present mining claim records derived from Bureau of Land Management files. See Table J-3 for an explanation of the derivation of categories. Note that Category V includes "all other" areas, both unknown and unfavorable for mineral deposits. It would be difficult to differentiate these areas on a map, since new discoveries sometimes result in mines being located in areas previously considered unfavorable.

Auburn Creek - Category IV (Map No. 30)

This is a small area of perlite occurrences on Auburn Creek, southeast of Dooley Mountain within rhyolite of Tertiary age. The perlite has been prospected in the past and is currently being explored by a Portland area perlite processor. If a sufficient quantity of commercial grade material is developed, surface mining can be expected in the area.

Baker - Category III (Map No. 21)

This area is located on the east slopes of the Elkhorn Ridge, just west of Baker, and includes the old Baker mining district. It is largely underlain by argillite and chert of late Paleozoic to Triassic age on the southeastern margin of the Jurassic or Cretaceous Bald Mountain batholith. Also included are areas of Permian gabbro and Jurassic or Cretaceous porphyry dikes. This has been primarily a placer gold area, although numerous lode gold prospects are known to exist. Known lode mineralization is confined to pockets along narrow northwesterly-trending quartz veins and northeasterly-striking shear zones.

Estimated past production -

Mine	Location	Production	(Refs)
Nelson Placer	Sec. 8, T. 9 S., R. 39 E.	$400,000	Brooks & Ramp, 1968
Tom Paine	Sec. 7, T. 9 S., R. 39 E.	70,000	Brooks & Ramp, 1968
Misc. Lode	2 or 3 other mines	30,000	Brooks & Ramp, 1968
	Total		$500,000

Estimated metal output:
24,000 oz. gold; 6000 oz of silver.

Hobby-size and commercial scale placer operations are seasonally active, and some lode prospects are being explored and developed on a small scale. Most of the present placer mining activity is along Elk Creek, with other more sporadic operations along California Gulch, Washington Gulch, and

Griffin Gulch. Small scale exploration continues for high grade pockets on the lode deposits with limited success. Placer deposits remain the most likely target for serious mining ventures in the area.

Bald-Dooley - Category IV (Map No. 28)

This area covers a variety of mineral occurrences along the crest and south slope of a ridge which includes Bald Mountain and Dooley Mountain. Country rock includes late Paleozoic-to-Triassic phyllite, chert, gabbro, and serpentinite; and Tertiary rhyolite. Placer gold has been produced from Tertiary and Quaternary gravel deposits. Lode mineralization is associated with quartz stringers and lenses in the pre-Tertiary rocks. Numerous prospects are located in the area, but none have recorded any production. The presence of placer gold in the streams and terraces indicates that the lodes or their eroded upper portions contained gold. No production figures are available for the placer deposits.

Low grade molybdenum occurrences have been identified within the Tertiary rhyolite, along with a few uranium anomalies. Gold-bearing gravels along Cow Creek were worked in the past, and the gravels along and above Pine Creek (covered separately) are still being mined. It is likely that sporadic exploration will continue on the lode prospects, but development and production are unlikely in the near term.

Beaver Creek - Category IV (Map No. 22)

This small area is located between the settlements of Greenhorn and Granite, and is on the north margin of the old Greenhorn mining district. It covers part of two separate limonitic quartz breccia zones in chert and argillite of late Paleozoic to Trassic age, and two patches of Tertiary gravel which are potentially gold-bearing. There are prospects on the breccia zones, and at least one outcrop sample shows slightly anomalous gold values (0.7 ppm - Ore. Dept. Geol. files). There is little evidence of placer mining on the gravel deposits.

There is no indication of any past mineral production and there are presently only a few placer claims in the area. The indications of mineralization and the proximity to the Greenhorn area make it likely that the area will receive attention from lode and placer prospectors.

Beaverdam - Category IV (Map No. 26)

This area is largely south of the Forest boundary in the vicinity of the town of Hereford. Most of the area is underlain by Tertiary volcaniclastics and flows. Exploration for epithermal gold deposits has recently been conducted in the area. Occurrences of antimony and mercury minerals and some disseminated chalcopyrite are known to exist, but sufficient data are not available to estimate the mineral potential. There has been no mineral production from this area, but continued exploration may be expected. Most activity will undoubtedly be outside the Forest boundaries.

Blue Jacket - Category III (Map No. 2)

This area contains part of the old Crooks Corral mining district and is within the much larger Kirkwood Creek mineralized zone (described separately.) It is located in the Kirkwood Creek and upper parts of the Kirby Creek and Corral Creek drainages on the Idaho side of Hells Canyon. The Blue Jacket Mine is the focus of attention, having a considerable resource blocked out in volcanogenic veins and lenses. Company figures indicate 2.25 million tons of silver-copper-zinc ore (Willden, 1979).

Past Production:

Mine	Location	Production	(Refs)
Blue Jacket	Sec. 27, T. 26 N., R. 1 W.	$3,100	Close, et al, 1982; U.S. Bur. Mines file

Estimated metal output:
1 oz. of gold; 1255 oz. of silver; 16,525 lb. of copper.

The Blue Jacket Mine and adjacent area under active claims contain a substantial resource. It is likely that an attempt will eventually be made to develop the deposit.

Bourne - Category II (Map No. 17)

This area encompasses the old mining camp of Bourne, north of Sumpter, and includes the heart of the old Cracker Creek mining district. Most of this area is underlain by argillite and chert of late Paleozoic to Triassic age. Jurassic or Cretaceous quartz diorite is exposed along the northern margin, and masses of Permian gabbro outcrop in the southeastern portion.

Mineralization occurs near the margin of the quartz diorite intrusive along steep, northeast-trending vein-fault zones. Included is a highly productive structure known as the North Pole-Columbia Lode which has an average width of 25 feet and is traceable for 4½ miles.

Past Production:

Mine	Location	Production	(Refs)
Belle of Baker	Sec. 35, T. 8 S., R. 36 E.	$400,000	Brooks & Ramp, 1968
Buckeye	Sec. 27, T. 8 S., R. 37 E.	6,000	Ibid.
Columbia	Sec. 32, T. 8 S., R. 37 E.	3,640,000	Ibid.
E and E	Sec. 32, T. 8 s., R. 37 E.	1,065,000	Ibid.
Golconda	Sec. 32, T. 8 S., R. 37 E.	550,000	Ibid.
Mammoth	Sec. 35, T. 8 S., R. 36 E.	40,000	Ibid.
Mountain View	Sec. 17, R. 8 S., R. 37 E.	100,000	Ibid.
North Pole	Secs 28&29, T. 8 S. R. 37 E.	2,120,000	Ibid.
Taber Fraction	Sec. 32, T. 8 S., R. 37 E.	296,000	Ibid.
Miscellaneous	Several other properties (est)	783,000	Ibid.
Total		$9,000,000	

Estimated metal output:
425,700 oz. of gold; 425,700 oz. of silver.

Considerable recent work has been done on the North Pole-Columbia Lode and some of the smaller structures. Projects are currently on hold due to economic conditions. The area has potential for development of ore along the North Pole-Columbia lode, Bald Mountain-Ibex vein, and other persistent structures.

Cable Cove - Category II (Map No. 16)

This area coincides approximately with the old Cable Cove mining district located in a high cirque valley at the head of Silver Creek northwest of Sumpter. The area is in glaciated terrain underlain primarily by Jurassic or Cretaceous quartz diorite with some late Paleozoic to Triassic argillite and chert in the northwestern portion. Gold mineralization occurs in northeasterly trending vein-shear zones containing pyrite, arsenopyrite, and some sphalerite and galena. Although several mines in the area were rather extensively developed in the past, relatively little ore was shipped.

Past production estimates:

Mine	Location	Production	(Refs)
California	Secs 14&15, T. 8 S., R. 36 E,	$ 40,000	Brooks & Ramp, 1968
Imperial-Eagle	Sec. 14, T. 8 S., R. 36 E.	100,000	Ibid.
Last Chance	Sec. 14, T. 8 S., R. 36 E.	5,000	Ibid.
Mile High	Sec. 22, T. 8 S., R. 36 E.	1,000	Ibid.
Total		$146,000	

Estimated metal output:
7,900 oz. of gold; 71,500 oz. of silver.

Considerable recent exploration activity on the numerous lode prospects in the area together with high silver and gold values shown by samples taken from dumps and outcrops combine to indicate a relatively high probability for the development of high grade vein-type deposits.

Cornucopia - Category I (Map No. 8)

This area of high mineral potential, at the southeastern edge of the Wallowa Mountains, includes the gold veins of the Cornucopia Mine. Other prospects are included, but have contributed little to the overall production from the area.

Mineralization is largely confined to quartz veins and mineralized shear zones which cut granodiorite, schist, and greenstone. Ore minerals include pyrite, arsenopyrite, chalcopyrite, galena, and sphalerite with a little free gold and gold tellurides.

Past production figures:

Mine	Location	Production	(Refs)
Cornucopia	Secs 27&28, T. 6 S., R. 45 E.	$15 million	Brooks & Ramp, 1968
Simmons	Secs 15&16, T. 6 S., R. 45 E.	9,000	Ibid.
Total		$15,009,000	

Estimated metal output:
317,500 oz. of gold; 1,268,000 oz. of silver; 672,000 lbs. of copper; 122,000 lbs. of lead.

A recent exploration and development program has reopened part of the Cornucopia Mine. Further development awaits financial support and more favorable precious metals prices. Active mining claims cover most of the area which extends into the Eagle Cap Wilderness. Below the Cornucopia Mine, Pine Creek has been worked for placer gold. A high boulder content has prevented a thorough working of the deposit, and it still attracts interest from placer miners. Considerable potential exists for the production of additional precious metals from the vein systems of the Cornucopia Mine. Portions of these veins extend into the Eagle Cap Wilderness, which would be unaffected because access and mining would be underground. Some recent interest has also been shown in the mineral potential of other mines in the vicinity, including the Simmons and Norway properties.

Elkhorn - Category IV (Map No. 20)

This zone includes a large area on the north side of the Sumpter Valley, extending up Cracker Creek and adjoining the Bourne and Rock Creek areas on the north, and up Baboon Creek, over the Elkhorn Crest, down Marble and Salmon Creeks, and adjoining the Baker area on the east. Most of this area is underlain by argillite and chert of late Paleozoic to Triassic age.

Lenses of limestone, which occur within the argillite, have been quarried commercially at sites on Marble Creek and Baboon Creek.

Included within this zone are numerous gold-bearing Tertiary gravel deposits and Quaternary stream and bench gravel deposits including the gravels of the Sumpter Valley. A few lode gold deposits also occur in the area, but little is known about them.

Past production:

Mine	Location	Production	(Refs)
Cracker Creek placers	Cracker Creek	$3,000,000	Ore. Dept. Geol. files
Sumpter Valley placers	Sumpter Valley	10,483,000	Brooks & Ramp 1968
Total		$13,483,000	

Estimated metal output:
441,200 oz. of gold; 107,000 oz. of silver.

Numerous placer and a few lode claims are currently held in the area. Activity is confined to prospecting and hobby-size to small-scale commercial placer production. Some areas of unworked gravels still have a potential for gold production, and there may be a potential for recovering gold by reworking some of the large valley deposits. Lode potential is unknown, but there are reports of small high-grade occurrences.

Geiser - Category III (Map No. 24)

This area includes the old mining camp of Geiser and covers the eastern part of the old Greenhorn mining district. Lode gold prospects are found in exposures of pre-Tertiary rocks including late Paleozoic to Triassic argillite, amphibolite, metavolcanics, serpentinite, and serpentinite matrix melange. Tertiary volcaniclastics and flows and gold-bearing Tertiary gravels overlie the older rocks locally. Lode mineralization generally occurs in northwest-trending quartz veins and shear zones. Placer mines have been developed in the Tertiary gravels resting on pre-Tertiary bedrock.

Past production figures:

Mine	Location	Production	(Refs)
Bonanza	Sec. 10, T. 10 S. R. 35½ E.	$1,750,000	Brooks & Ramp 1968
Diamond Jack & Winterville Placer	Sec. 14, T. 10 S. R. 35½ E.	55,000	Ferns, et al, 1982
Parkerville Placer	Sec. 16, T. 10 S. R. 35½ E.	150,000	Ibid.
Total		$1,955,000	

Estimated metal output:
93,100 oz. of gold; 57,700 oz. of silver.

Numerous lode and placer claims are currently active in the area. The principal lode deposit, the Bonanza Mine, and the Tertiary gravel deposits undergo periodic exploration and development. Given favorable metal prices, more intensive activity can be expected.

Granite - Category II (Map No. 18)

This area covers a portion of the old Granite mining district lying north and east of the town of Granite. The southeastern third of the area is underlain by Jurassic or Cretaceous quartz diorite while most of the remainder is underlain by argillite and chert of late Paleozoic to Triassic age.

Lode gold mineralization occurs in northeast-trending veins and shear zones in the argillite, chert, and quartz diorite. Post-mineral Tertiary volcanic flows and clastics to the southwest may cover similar deposits. Some Tertiary and recent gold-bearing placer deposits also occur in the area.

Production from mines within and adjacent to the Wallowa-Whitman National Forest:

Mine	Location	Production	(Refs)
Ajax	Sec. 22, T. 8 S., R. 35½ E.	$ 40,000	Brooks & Ramp, 1968
Buffalo	Sec. 14, T. 8 S., R. 35½ E.	1,150,000	Ibid; Koch, 1959
Continental	Sec. 12, T. 8 S., R. 35½ E.	50,000	Ibid; Ibid.
Cougar-Independence	Secs 22&27, T. 8 S., R. 35½ E.	767,000	Koch, 1959
LaBelleview	Secs 6&7, T. 8 S., R. 36 E.	500,000	Brooks & Ramp, 1968
Monumental	Secs 18&19, T. 8 S., R. 36 E.	100,000	Ibid.
New York	Sec. 27, T. 8 S., R. 35½ E.	8,000	Ibid.
Standard	Sec. 12, T. 8 S., R. 35½ E.	1,000	Ore. Dept. Geol. Bull. 14-B
Total		$2,616,000	

Estimated metal output:
74,600 oz. of gold; 868,500 oz. of silver; 49,000 lbs. of copper; 190,000 lbs. of lead; 41,000 lbs. of zinc.

Several mining companies and numerous individuals have been actively exploring and, in some cases, developing mines and prospects in the area. Placer production has been small, but there are numerous placer claims and a few hobby-size placer mining operations. The main potential for the area lies with the possibility of developing minable grades and tonnages on the lode deposits. Given favorable gold and silver prices, continued exploration, development, and possibly production may be expected.

Greenhorn - Category III (Map No. 23)

This area includes the main portion of the old Greenhorn mining district, encompassing the townsite of Greenhorn and extending into the Clear Creek drainage to the north. The Wallowa-Whitman National Forest contains a little over half of this area, which extends onto the Umatilla and Malheur National Forests as well. A wide variety of rock types underlie the area, including late Paleozoic-to-Triassic argillite, gabbro, metavolcanics, serpentinite, and serpentinite matrix melange; Jurassic or Cretaceous quartz diorite and granodiorite intrusives; Tertiary volcanic flows, volcaniclastics, and gravel deposits; and Quaternary glacial and alluvial sediments. Lode gold mineralization occurs in narrow quartz veins and shear zones striking northwest to northeast in the pre-Tertiary rocks. Placer gold is found in Tertiary gravels and modern stream channel and bench deposits.

Past production from properties within or adjacent to the Wallowa-Whitman National Forest:

Mine	Location	Production	(Refs)
Banzette	Sec. 16, T. 10 S., R. 35 E.	$ 5,000	Brooks, et al, 1983
Diadem/Brindle Horse	Sec. 17, T. 10 S., R. 35 E.	1,800	Ibid.
Don Juan	Sec. 15, T. 10 S., R. 35 E.	2,000	Ore. Dept. Geol. files
Golden Eagle	Sec. 15, T. 10 S., R. 35 E.	75,000	Ferns, et al, 1982
IXL	Sec. 10, T. 10 S., R. 35 E.	20,000	Ibid.
Owl	Sec. 10, T. 10 S., R. 35 E.	14,000	Ibid.
Paramount	Sec. 16, T. 10 S., R. 35 E.	500	Brooks, et al, 1983
Phoenix	Sec. 15, T. 10 S., R. 35 E.	2,800	Ore. Dept. Geol. files
Psyche	Sec. 17, T. 10 S., R. 35 E.	90,000	Brooks, et al, 1983
Pyx	Sec. 1 , T. 10 S., R. 35 E.	300,000	Ferns, et al, 1982
Rabbit	Sec. 10, T. 10 S., R. 35 E.	40,000	Ibid.
Red Bird	Sec. 10, T. 10 S., R. 35 E.	12,000	Ibid.
Roberts	Sec. 21, T. 10 S., R. 35 E.	10,000	Brooks, et al, 1983
Royal White	Sec. 3 , T. 10 S., R. 35 E.	7,500	Ferns, et al, 1982
Snow Creek	Sec. 16, T. 10 S., R. 35 E.	52,000	Brooks, et al, 1983
Virginia	Sec. 10, T. 10 S., R. 35 E.	20,000	Ferns, et al, 1982
Total		$652,600	

Estimated metal output:
31,600 oz. of gold; 42,300 oz. of silver; 3 flasks of mercury.

The large number of lode and placer gold occurrences keep prospectors interested, but the indicated size of the targets has generally discouraged larger companies from conducting substantial exploration programs in the area. Several small placer mines and at least one small lode prospect have been seasonally active.

Prospecting can be expected to continue, both by individuals and by larger mining companies conducting regional exploration programs. Small pocket mines will probably be developed and operated as economic conditions permit. Several small but relatively rich placer deposits will be operated seasonally.

Greenhorn-Whitney - Category IV (Map No. 25)

This is a large area of placer gold deposits and some lode gold prospects which extends onto the Malheur National Forest on the southwest, adjoins the Greenhorn area on the northwest, surrounds the Geiser area and is contiguous with the Elkhorn area on the north. The western portion of the area includes part of the old Greenhorn mining district. Much of the area is covered by Tertiary volcaniclastics and flows, and Quaternary gravels mantle much of the Whitney Valley in the southeastern portion. Late Paleozoic to Triassic argillite is exposed in the northeastern part, and argillite, gabbro, and serpentinite of similar age occur in isolated patches in the western part of the area. Some lode mineralization is found in the older rocks, in north to northwesterly trending quartz veins and shear zones. Placer deposits are found in patches of older gold-bearing Tertiary gravels and in Quaternary gravels derived from the Tertiary gravels.

Estimated past placer production:

Mine	Location	Production	(Refs)
Misc. stream and bench placers	N. Fk. Burnt River and tributaries	$1,519,000	Brooks & Ramp, 1968; Ferns, et al, 1982

Estimated metal output:
70,000 oz. of gold; 14,500 oz. of silver.

Very little is known about the few lode prospects of the area. One mine with a small mill is currently being developed. If operation of the mine proves economically viable, exploration of other properties is likely to occur. The area contains numerous placers which have been only partially exploited in the past. Bench placers along the North Fork of the Burnt River are being worked seasonally, and there are on-going testing operations on some of the high Tertiary gravel deposits. It is likely that, given an adequate gold price, there will be continued placer exploration, development, and production.

Homestead - Category I (Map No. 6)

This area covers part of the old Homestead mining district, and is located at the southwestern end of a mineralized zone extending from Homestead, Oregon to Cliff Mountain in Idaho. It is a zone of high mineral potential centered around the currently active Iron Dyke Mine which is adjacent to the Hells Canyon National Recreation Area. Gold-copper-silver mineralization is found in irregular lenses of disseminated pyrite and chalcopyrite in sheared greenstone which was originally a volcanic mudflow.

Production from 1910 to present:

Mine	Location	Production	(Refs)
Iron Dyke	Sec. 21, T. 6 S., R. 48 E.	$13.5 million	Brooks & Ramp, 1968; Wise, 1983

Estimated metal output:
50,000 oz. of gold; 281,500 oz. of silver; 16,900,000 lbs of copper.

The Iron Dyke Mine has been operated sporadically in recent years, due to fluctuations in metal prices, and difficulties in developing reserves in the irregular lenses of ore-grade mineralization. Ore from the mine is trucked 22 miles up out of the Snake River canyon to a mill at Cuprum, Idaho, and from there concentrates are shipped to a smelter.

Land within the National Forest is covered with unmineralized Tertiary basalt flows, and is withdrawn from mineral entry by PL 94-199 which created the Hells Canyon National Recreation Area. The mineralized zone probably extends onto National Forest land, beneath the basalt cover.

Homestead-Cliff Mountain - Category IV (Map No. 5)

This area of gold, silver, and copper mineralization includes most of the old Homestead mining district in Hells Canyon of the Snake River in Oregon and Idaho and the Seven Devils mining district in the Seven Devils Mountains of Idaho. Areas of higher mineral potential at the northern (Red Ledge) and southern (Homestead) ends are discussed separately. The Copper Cliffs Mine at Cuprum, Idaho is within this zone, but is completely within the Payette National Forest.

The only production has come from the Iron Dyke Mine at Homestead, and the Copper Cliffs, Peacock, and South Peacock Mines near Cuprum. Most of the recent exploration activity has been concentrated in these areas, as well as around the Red Ledge Mine. All of the lands within or administered by the Wallowa-Whitman National Forest in this zone are withdrawn from mineral entry by PL-94-199.

The area has potential for the development of volcanogenic sulfide deposits, like those at the Iron Dyke, Copper Cliffs, and Red Ledge Mines. Tactite deposits in this zone have produced in the past, but are small and difficult to explore if they do not outcrop.

Jackley Mountain - Category IV (Map No. 3)

This mineralized zone is centered around Jackley Mountain in Idaho, and includes the old Mountain View mining district. The mineral deposits are essentially all gold and silver-bearing fissure veins or mineralized shear zones in volcanics intruded by diorite.

Past production figures for area mines within Hells Canyon NRA:

Mine	Location	Production	(Refs)
Bald Eagle	Sec. 10, T. 22 N., R. 2 W.)	$150,000	Close, et al, 1982
Maid of Erin	Sec. 2, T. 21 N., R. 2 W.)		
Summit	Sec. 3, T. 21 N., R. 2 W.)		

Estimated metal output:
7,200 oz. of gold; 1,500 oz. of silver.

All of the land administered by the Wallowa-Whitman National Forest is within the Hells Canyon National Recreation Area, and therefore withdrawn from mineral entry. There are no mining claims now held within this area.

The area has the potential for the development of additional vein-type deposits. Resources undoubtedly exist at undeveloped properties as well as on down-dip extensions of known deposits.

Keating - Category IV (Map No. 10)

This area includes a portion of the old Eagle Creek mining district lying northeast of the settlement of Keating. Most of the area is southwest of the Forest boundary. Bedrock over most of the area is Permian or Triassic greenstone and Triassic quartz diorite. A few patches of Tertiary basalt cover the older rocks in the eastern portion of the area.

Mineralization occurs as stringers and disseminations of sulfides in sheared and fractured greenstone. Metal values are primarily in copper and gold. Ore minerals include pyrite and chalcopyrite.

Past production adjacent to the Forest:

Mine	Location	Production	(Refs)
Poorman	Sec. 32, T.7 S., R. 43 E.	$380,000	Brooks & Ramp, 1968

Estimated metal content:
8,100 oz. of gold; 4,000 oz. of silver; 1,047,000 lbs. of copper.

All of the past production from this area has come from outside the Forest. The area is currently heavily claimed, with only a few claims extending onto the Forest. The irregular nature of the sulfide deposits makes exploration difficult. However, the area has potential for development of additional copper-gold ore bodies.

Kirkwood Creek - Category IV (Map No. 1)

This mineralized zone is at the easternmost portion of the Hells Canyon National Recreation Area, and is largely in Idaho. It covers pre-Tertiary volcanogenic lenses and veins containing copper, zinc, silver, and some included gold mineralization.

Past production for mines in the area:

Mine	Location	Production	(Refs)
Crooks Corral Plcr	Sec. 12, T. 25 N., R. 2 W.	$ 4,000	Close, et al, 1982
Duncan	Secs 23&24, T. 26 N., R. 1 W.	5,500	Ibid; U.S. Bur. Mines file
Snake River Plcrs	Secs 19&20, T. 26 N., R. 1 W.	5,500	Close, et al, 1982
Total		$15,000	

Total metal output of record:
540 oz. of gold; 10 oz. of silver; 27,400 lbs of copper.

All of the active mining claims in this zone are clustered in the general vicinity of the Blue Jacket Mine (listed separately), and the NRA is withdrawn from further mineral entry.

Indications of significant ore mineralization similar to the Blue Jacket Mine have been found in this zone, but the occurrences will remain undeveloped due to the closure to mineral entry.

Limber Jim-Meadow Creek - Category IV (Map No. 11)

This zone includes part of the old Camp Carson mining district, covering tributaries of the upper part of the Grande Ronde River, and is known primarily as an area of placer deposits. Bedrock in much of the area is Jurassic or Cretaceous quartz diorite with some Tertiary volcaniclastics and basalt flows covering the northern and northeastern portions.

Production information:

Mine	Location	Production	(Refs)
Rainbow (placer)	Secs 1&2, T. 6 S., R. 36 E.	Few thous. yds	Brooks & Ramp, 1968; Ore. Dept. Geol. files
Stibnite (lode)	Sec. 5, T. 6 S., R. 37 E.	3 cars antimony ore	Ore. Dept. Geol. files

Several gold placer and a few lode prospects are included in the area, but there are no definitive production records for any of them. There are currently numerous placer and a few lode claims actively held within this zone.

Very little is known about this area, but there are numerous exposures of gold-bearing Tertiary gravel of unknown grade as well as small present day stream placers formed from reworking of the older gravels. Lode mining potential appears to be limited because of the narrow widths of veins and shears which cut the intrusives, but little exploration and development has been done other than by individual prospectors.

Medical Springs - Category IV (Map No. 9)

This area includes a portion of the old Medical Springs mining district, just northeast of the settlement of Medical Springs. It is a small area of Triassic greenstone and Jurrassic or Cretaceous granodiorite, surrounded by unmineralized Tertiary basalt flows. Gold mineralization is confined to narrow veins and shear zones in the greenstone.

Past production for the area:

Mine	Location	Production	(Refs)
Twin Baby	Sec. 20, T. 6 S., R. 42 E.	Few thousand $	Brooks & Ramp, 1968

Several lode and placer claims are currently held in the area. Mineralization is narrow and spotty, and most production came from high grade pockets. Other ore-grade material may exist, but the limited size potential reduces the likelihood of extensive exploration and development.

Mt. Ireland - Category IV (Map No. 19)

This is a large mineralized area east of Granite and northwest of Sumpter which surrounds and adjoins areas of higher estimated mineral potential including Granite, Cable Cove, and Bourne. It includes portions of the old Granite, Cable Cove, and Cracker Creek mining districts. On the southeast, it is contiguous with the Greenhorn-Whitney area. Much of the central portion of the area is underlain by Jurassic or Cretaceous quartz diorite. Argillite and chert of late Paleozoic to Triassic age underlie the extreme northwestern portion, and are included with Permian gabbro, Triassic serpentinite-matrix melange, small Jurassic or Cretaceous intrusives, and Tertiary basaltic to dacitic flows and intrusives on the northeastern and southern margins. Lode gold-silver mineralization is generally confined to veins and shear zones. Placer gold deposits are found in Tertiary gravels and present-day stream and bench gravels.

Past production data:

Mine	Location	Production	(Refs)
Argonaut	Sec. 19, T. 8 S., R. 37 E.	Small(unk.)	Brooks & Ramp, 1968
Buck Gulch Pl.	Sec. 26, T. 9 S., R. 36 E.	Consid. yardage of unk. grade.	Ore. Dept. Geol. Bulls. 14-A & B; Pardee, et al, 1941
Griffith Pl.	Secs 16&17, T. 9 S., R. 36 E		
Weaver Pl.	Sec. 25, T. 9 S., R. 36 E.		
Granite plcrs*	Granite, Bull Run, & Clear Crs.	$2,422,000	Brooks & Ramp, 1968; Ore. Dept. Geol. files

Total estimated metal production:
89,200 oz. of gold; 20,900 oz. of silver.

* Includes Umatilla Forest area production.

Many active lode and placer claims are included in this area. Most of the activity is confined to exploration of lode prospects by individuals, with some regional reconnaissance by mining companies, and exploration and development of hobby-size and small commercial placer deposits.

A large amount of Tertiary gravel of unknown grade remains, as well as some bench gravels along present streams. It is likely that the area will continue to see exploration and development attempts on the placer deposits as well as the numerous lode prospects.

Onion Creek - Category IV (Map No. 14)

This area is contiguous with the Crane Creek area on the Umatilla National Forest, which is in turn contiguous with the North Fork area which extends along the North Fork of the John Day River and some of its tributaries to the settlement of Dale. It adjoins the north end of the Granite District and includes both lode and placer gold prospects. Bedrock is predominantly argillite and chert of late Paleozoic to Triassic age with some Tertiary volcanic and Quaternary glacial cover in the northwestern portion of the area.

Production from adjacent area on the Umatilla National Forest:

Mine	Location	Production	(Refs)
Klopp Placer	Sec. 34, T. 8 S., R. 35½ E.	$342,000	Ore. Dept. Geol. Bull. 14-B

Estimated metal output:
16,400 oz. of gold; 7,000 oz. of silver.

The Klopp Placer is a glacial moraine of very low grade which was worked by hydraulic methods. It is unlikely that similar material could be worked profitably today while meeting water quality and reclamation standards. Some potential for small placer operations undoubtedly exists in small pockets of unworked material untouched by glaciation. Numerous prospects and the proximity of the Granite district make the area favorable for continued exploration for lode deposits.

Pine Creek - Category III (Map No. 29)

This is a gold placer mining area along and in benches above Pine Creek, which flows into the Burnt River east of Hereford. Much of this area is located off the National Forest. Bedrock on the Forest portion is late Paleozoic to Triassic phyllite and chert, with lesser amounts of gabbro, and serpentinite. Gold-bearing gravels mantle much of the older rock within the Pine Creek drainage. Small-to-medium size commercial placer operations are active on the more extensive gravel deposits on BLM and private land below the Forest boundary.

Deposits on the Forest are the subject of periodic exploration ventures, but have not been actively mined for several years. This drainage has produced a considerable (but unrecorded) amount of nugget gold in the past. Continued exploration and some production is likely in the near term.

Red Ledge - Category III (Map No. 4)

This mineralized zone surrounds the Red Ledge Mine on Deep Creek in Idaho, and barely extends onto the Hells Canyon National Recreation Area. The Red Ledge Mine was excluded from the NRA because of its known mineral potential.

There has been no production from this zone, but company figures list 42 million tons of reserves containing gold, silver, copper, and zinc at the Red Ledge Mine (Juhas,1980). This volcanogenic sulfide deposit consists of blebs and stringers of pyrite, chalcopyrite, sphalerite, bornite, and chalcocite associated with quartz in andesite and silicic volcanic rocks of Permian to late Triassic age.

The Red Ledge Mine and adjacent property are currently being explored and evaluated. Steep terrain makes access and development difficult.

Rock Creek - Category III (Map No. 18)

This area is located in the Rock Creek and Pine Creek drainages northwest of Baker. The northern half is underlain by Jurassic or Cretaceous quartz diorite and the southern half is underlain by argillite and chert of late Paleozoic to Triassic age. Gold-silver mineralization occurs in northeasterly-striking quartz veins and shear zones near the argillite-intrusive contact.

Past production figures:

Mine	Location	Production	(Refs)
Baisley-Elkhorn	Secs 20&21, T. 8 S., R. 38 E.	$950,000	Brooks & Ramp, 1968
Highland-Maxwell	Secs 19&20, T. 8 S., R. 38 E.	625,000	Ibid.
Total		$1,575,000	

Estimated metal output:
60,400 oz. of gold; 544,200 oz. of silver.

Most of the old mines and prospects are currently under claim but there are no intensive exploration/development programs underway. This area appears to have additional potential for ore development on and adjacent to the old lode properties.

Trail Creek - Category IV (Map No. 13)

This area includes the old Trail Creek mining district, covering parts of the South and Middle Forks of Trail Creek and lesser tributaries of the North Fork of the John Day River. This is primarily an area of gold placers in Tertiary gravels and some reworked modern stream gravels. Areas disrupted by Pleistocene glaciation are generally devoid of placer gold potential. Bedrock is Jurassic or Cretaceous quartz diorite of the Bald Mountain Batholith over the eastern portion, and Triassic gabbro in the western portion.

Mine	Location	Production	(Refs)
French Diggings Placer	Secs 20&29, T. 7 S., R. 36 E.	$387,000	Ore. Dept. Geol. Bull. 14-B

Estimated metal output:
18,600 oz. of gold; 4,300 oz. of silver.

Currently active placer claims cover the old French Diggings Placer, similar deposits, and portions of Trail Creek.

There reportedly is a considerable volume of gold-bearing gravel left around French Diggings, and there may be a potential for other, smaller deposits in areas not affected by Pleistocene glaciation.

Unity - Category III (Map No. 31)

This area is located at the south end of the Forest, and extends from Mine Ridge on the northwest, past Murray Hill to the southeast. This large mineralized zone is located along a trend of Cretaceous diorite and quartz diorite stocks which intrude late Paleozoic to early Mesozoic ultramafic rocks and serpentinite matrix melange, and Jurassic sedimentary rocks.

Rocks in the mineralized zone have been hydrothermally altered, and contain some disseminated copper and molybdenum. Gold prospects are found in the northern part of the zone.

Past production estimates for mines in and adjacent to the National Forest:

Mine	Location	Production	(Refs)
Bull Run Cr (plcr)	Sec. 36, T. 13 S., R. 36 E., and Sec. 1, T. 14 S., R. 36 E.	$ 76,000	Brooks & Ramp, 1968
Bull Run (lode)	Sec. 2, T. 14 S., R. 36 E.	10,000	Ibid.
Record	Sec. 1, T. 14 S., R. 36 E.	103,000	Ibid.
Thomason	Sec. 6, T. 14 S., R. 37 E.	unavailable	Ore. Dept. Geol. files
Total		$189,000	

Estimated metal output:
7,500 oz. of gold; 800 oz. of silver.

One small gold mine, the Thomason, is worked seasonally on a small scale. Much of the area is claimed by one company which has maintained an interest in the area for several years.

Current economic conditions make a copper-molybdenum property unattractive. However, continued exploration, possible development, and some small scale mining of the gold occurrences in the northern part of the zone can be expected.

Upper Grande Ronde - Category III (Map No. 12)

This area adjoins the Limber Jim - Meadow Creek area, and includes the heart of the old Camp Carson mining district. It is assigned a higher rank due to recent attempts to reactivate the old Camp Carson placer mine. Aside from a relatively small patch of Tertiary volcaniclastic rocks, bedrock in the area is Jurassic or Cretaceous quartz diorite.

Production information:

Mine	Location	Production	(Refs)
Aurelia	Sec. 26, T. 7 S., R. 36 E.	"some high grade (gold-silver) ore"	Ore. Dept. Geol. Bull. 14-A & files
Camp Carson	Sec. 22, T. 7 S., R. 36 E.	Few hund.thous. yds.	Ore. Dept. Geol. Bull. 14-A
Indianna	Sec. 9, T. 7 S., R. 36 E.	Few thous. tons. 28 tons develop. ore: 0.15 oz/t Au; 35.2 oz/t Ag; 2.4% Pb; 1.5% Zn	Ore. Dept. Geol. files

Most of the claims in the area cover gold-bearing Tertiary gravels - either in situ, or in reworked deposits along present day drainages. Very little is known about the lode prospects in the area, but there are some interesting indications of mineralization.

The Camp Carson and other placers in the area have substantial yardages of resources of unknown grade which will continue to be explored and possibly developed, if economic conditions warrant. Since very little is known about the lode deposits, it is difficult to estimate their potential. The available information does indicate some potential for silver and gold with associated base metals.

Wallowa Mountains - Category IV (Map No. 7)

This area includes an irregular band of mineral occurrences which pass through the eastern portion of the Wallowa batholith, and includes tactites, igneous-sedimentary and igneous-metavolcanic contact zones, shear zones, fissure veins, and disseminations extending from near the Forest boundary south of Enterprise and Joseph on the north, through the Sparta area on the south. Included are portions of the old, unorganized Wallowa Range, Eagle Creek, Sparta, Sanger, and Keating mining districts. Also included are drainages with small yardage placer gold potential.

Past production figures for mines within and adjacent to the National Forest:

Mine	Location	Production	(Refs)
Dolly Varden	S. 19&30, T. 7 S., R. 44 E.	$115,000	Brooks & Ramp, 1968
Eagle Creek plcrs	T. 6&7S. R. 44 E.	150,000	Ore. Dept. Geol. files
Sanger (lode)	S. 2, T. 7 S., R. 43 E.	1,500,000	Brooks & Ramp, 1968
Sanger (placer)	S. 10, T. 7 S., R. 43 E.	500,000	Ibid.
Sheep Rock	S. 32, T. 6 S., R. 44 E.	30,000	Ibid.
Total		$2,295,000	

Estimated metal content:
110,000 oz. of gold; 27,500 oz. of silver.

Much of this zone is within the Eagle Cap Wilderness, and therefore withdrawn from mineral entry. Many mineral occurrences have been prospected in the past, but, due to small size and difficulty of access, very few have produced ore. Without the restrictions of wilderness designation, this area would undoubtedly have received much greater mineral exploration emphasis in recent years. Most existing claims are in the area south of the wilderness boundary, extending off the Forest and covering part of the old Sparta District. Most mineral activity consists of prospecting of lode deposits by individuals, and operating hobby-size placers along Eagle Creek and some of its tributaries.

Tactite deposits and vein/shear zones containing copper, tungsten, molybdenum, gold, and silver are the best known and most clearly defined deposits, but the greatest potential undoubtedly lies with large tonnage disseminated copper-molybdenum deposits, possibly with precious metals credits.

Whipple Gulch - Category IV (Map No. 27)

This area is centered around Whipple Gulch in the Big Creek drainage north of the town of Hereford. Most of this area is underlain by argillite, chert, and phyllite of late Paleozoic to Triassic age. Tertiary volcaniclastics outcrop in the southwestern portion. Lode mineralization is found in quartz veins and lenses, and in shear zones in the older rocks. Portions of Whipple Gulch have been worked for placer gold in the past.

Very little is known about this area, and there are no records of any production. It is likely that there will be continued exploration of the lode deposits.

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Appendix K

SENSITIVITY LEVEL 1 AND 2 TRAVEL ROUTES

This appendix identifies and describes the visually sensitive travel routes on the Forest. A map showing Sensitivity Level 1 and Level 2 travel routes is provided in the map packet which accompanies the Draft Environmental Impact Statement. The major travel routes are the most sensitive (Sensitivity Level 1). The viewshed number refers to the areas mapped on Figure IV-1 and shown in Table IV-5 and IV-5a of the Draft Environmental Impact Statement. Less sensitive viewsheds (Sensitivity Level 2) are listed in Table IV-5a of the DEIS. Maps showing the viewsheds associated with these Level 2 routes are available for review at the National Forest Headquarters in Baker, Oregon.

SENSITIVITY LEVEL 1 & LEVEL 2 TRAVEL ROUTES

Travel Routes	Sensitivity Level	General Description	Viewshed*
Grande Ronde River	1	Grande Ronde River Corridor (between Umatilla and Wallowa-Whitman National Forest	1
Highway 3	1	State Highway 3 north of Enterprise	2
Trail 1653	1	Bear Creek	3
Road 8250	1	Road to Bear Creek Campground	3
Road 8210	1	Lostine Canyon	4
Road 8205	1	Hurricane Creek Road	5
State Highway 82	1	Wallowa Valley	5
Trail 1807	1	Hurricane Creek Trail	5
Trail 1812	1	McCully Creek	5
Tramway	1	Mount Howard Tramway	5
Road 39	1	Wallowa Mountain Loop Road, entire	5,7
Road 3960	1	Ollokot to Indian Crossing Campground	8
County Road 727	1	Imnaha to Neiman Ranch	9
Road 4260	1	Imnaha to Dug Bar	10
Road 493	1	Melhorn Saddle to Pittsburg Landing	11
Idaho Power Road 1039	1	Oxbow to Hells Canyon Dam	12
Road 6610	1	Clear Creek to Trail 1867	13
Road 66	1	Clear Creek to Fish Lake	13,14,22
State Highway 86	1	Richland to Oxbow	14
Road 7740	1	East Eagle Creek	15
Road 7755	1	Eagle Creek - Boulder Park area	16
Road 7015	2	Empire Gulch - Switchback above Eagle Creek	16,31
Road 7015	1	Switchback to Junction with Road 77	16
Highway 203	1	State Highway 203 (Catherine Creek State Park, et al)	17

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*Refer to Figure IV-1 and Tables IV-5 and IV-5a in Chapter IV of the DEIS.

Travel Routes	Sensitivity Level	General Description	Viewshed*
Road 77	1	Corridor from State Highway 203 through Bald Hill, to Flagstaff Butte, and Junction Empire Gulch Road 7015	17
Trail 1914	1	West Eagle Meadows, (Fake Creek)	17
Road 67	1	Big Creek to Tamarack Campground	18
Road 6220	1	Mill Creek to Moss Springs	19
Summit Springs	1	Summit Springs Viewpoint overlooking Moss Springs	19
Highways 237 & 82	1	Grande Ronde and Cove Valley	20
Road 66	1	Duck Lake and Duck Creek Area	21
Road 66	1	Fish Lake Area	22
I-84	1	Interstate 84 and railroad corridor	23
State Highway 350	1	Lightning Creek to Imnaha (town)	24
State Highway 82	1	La Grande to Enterprise	25
Highway 244	1	State Highway La Grande to Ukiah	26
Road 51	1	Grande Ronde River Road to Tony Vey Meadows	27
Road 73	1	Elkhorn Loop Drive to Anthony Lakes	28,29
Winter Sports Area	1	Anthony Lakes Ski Area, et al	29
Trail 1606	2	Crawfish Lake Area	29
Trail 1606	1	Trail north from Crawfish Lake to Road 73	29
Trail 1611	1	Elkhorn Crest Trail, entire length	29,33,34
Road 7300380	2	Road from 73 to Peavy Cabin	30
Road 3120	1	Grandview Drive - Mt. Emily	31
Road 4240	1	Imnaha to Hat Point	32
Trail 1633	2	Trail 1633 to Twin Lakes	33
Road 6550	2	Road from Highway 7 to Trail 1633	33
Highway 7	1	Phillips Lake area	33
Road 7301	2	North Fork North Powder River	34
Trail 1632	2	North Fork North Powder River	34
Trail 1617	2	Killamacue Creek Trail	34
Trail 1621	1	Lost Lake and Meadow Lake	34
Goodrich Road	2	To Goodrich Reservoir	34
Pine Creek Road	2	To Pine Creek Reservoir	34
Trail 1626	2	Rock Creek Lake Trail	34
Trail 1628	2	From Road 5520 to Western Union Mine	34
Road 6510	2	Marble Creek Road	34
Road 5520	2	North Fork Rock Creek	34
Highway 7	1	State Highway 7 to Whitney-Tipton	35
County Road 507	1	North Burnt River (Whitney to King Ranch)	36
Highway 26	1	State Highway 26	37
Road 6005	1	Mammoth Springs, South Fork Burnt River	38
Jeep Road 1774	1	Memaloose to Somers Point to Lord Flat	39
Trail 1607	2	Dutch Flat Creek	40
Road 21	2	Spring Creek area	A

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*Refer to Figure IV-1 and Tables IV-5 and IV-5a in Chapter IV of the DEIS.

Travel Routes	Sensitivity Level	General Description	Viewshed*
Road 21	2	From 244 to Frog Heaven Meadows	B
Road 5160	2	From Highway 244 to Road 51	C
Trail 1853	2	Lookout Creek Trail from Road 5160 to Tower Mountain	C
Road 43	2	From Ladd Canyon to Elkhorn Drive Road	D
Road 5125	2	From Grande Ronde River to Ladd Canyon Road 43	D
Road 51	2	Tony Vey Meadows to North Fork John Day Campground	E
Road 52	2	From Road 51 to Ukiah	F
Road 73	2	North Fork of the John Day to Granite	G
Road 73	2	Sumpter to Granite	H
Road 1042	2	From Highway 7 to Greenhorn	I
Road 2640	2	From Mammoth Springs along Last Chance Creek	J
Road 1689	2	West Fork Camp Creek area	K
Road 1684	2	East Camp Creek	L
Old Highway 7	2	Stices Gulch to Mill Creek on Dooley Mountain	M
County Road 550	2	Road from Sumpter to Bourne	N
Road 73	2	From Badger Butte to North Fork of the John Day Campground	O
Trail 1843	2	Five Points Creek et al	P
Trail 1859	2	Five Points area	P
Trail 1842	2	Five Points area	P
Road 31	2	From I-84 to Conklin Spring	Q
Road 19	2	Beaver Meadows area	R
Road 62	2	Grey Mountain - Mount Moriah area	S
Road 6220	2	From Road 62 to an area south of Point Prominence	S
Road 600 & 650	2	Along South Fork Catherine Creek to Flagstaff Butte	T
Road 7785	2	North Fork Catherine Creek	T
Trail 1905	2	North Fork Catherine Creek to Catherine Creek Meadows	T
Road 1944	2	Middle Fork Catherine Creek Trail	T
Road 7045	2	Road Corridor from Balm Creek Reservoir to Road 67	U
Road 70	2	Sawtooth Ridge - Balm Creek area	U
Road 7735	2	Forest boundary to Eagle Forks Campground	V
Trail 1878	2	Along Eagle Creek	V
Road 77 and 7715	2	From Highway 86 to McBride Campground and Summit Point Trailhead	W
Road 70	2	From Forshey Meadow to Empire Gulch Road 7015	X
Road 46	2	From State Highway 3 to Crow Creek	Y
Road 46	2	Wellamotkin Drive (All)	Z

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*Refer to Figure IV-1 and Tables IV-5 and IV-5a in Chapter IV of the DEIS.

Travel Routes	Sensitivity Level	General Description	Viewshed*
Road 4620	2	Crow Creek Road	AA
Road 4625	2	Road 46 to Vigne Campground	BB
Road 420	2	Grave Point to Kirkwood Cow Camp	DD
Road 1819	2	Iron Phone Junction to Low Saddle	DD
Road 3935	2	To Mahogany Corral	GG
Trail 1640	2	Peavy Cabin to Summit of Elkhorn Ridge	N. Fork John Day Wilderness
Trail 1603	2	Baldy Creek	N. Fork John Day Wilderness
Trail 1601	2	Baldy Lake - Cable Cove Area	N. Fork John Day Wilderness
Road 1434	2	Bull Run Mountain, Table Rock, and Mine Ridge Area	Monument Rock Wilderness

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*Refer to Figure IV-1 and Tables IV-5 and IV-5a in Chapter IV of the DEIS.

Appendix L

COMPARISON OF CURRENT AND PREVIOUS TIMBER INVENTORIES AND PLANS

This appendix presents a comparison of the current (1979) timber inventory with the immediately previous (1968) timber inventory. It follows with the adjustment of the timber inventory data necessary for this Forest Plan, and concludes with comparison of timber outputs between Alternative C-departure in this DEIS and the unreleased 1979 Draft Timber Management Plan.

Reconciliation of the 1968 and 1979 Timber Inventories

Two comparisons are made between the 1968 and 1979 timber inventories in Table L-1. The first is based on the 1968 volume-per-acre figures expanded by the 1979 mapped inventory acres. This attempts to avoid problems encountered when using plots to estimate both acres and volume. The second compares the two inventories using the 1968 plot expansion volume as the starting point, adjusted to remove the plots which fell within the 1972 Eagle Cap Wilderness additions and Lower Minam Wilderness study area. It was necessary to remove these plots as they were not part of the 1979 inventory.

Step two shown in Table L-1, corrects the 1968 volume for changes in the procedure used to estimate net defect. This reduces the apparent green volume of the 1968 inventory by 368 million cubic feet. Mortality and harvest between 1968 and 1979 (steps 3 and 5, respectively) are subtracted, and growth (step 4) is added, to complete the update of the 1968 inventory to 1979. When this volume is compared to the 1979 inventory volume, an unaccounted difference of 5 and 44 cubic million feet remains using the two comparisons. This represents a 0.2 to 1.9 percent unaccounted difference between the two inventories.

Adjustments to the 1979 Timber Inventory

The 1979 timber inventory was adjusted prior to its incorporation into the FORPLAN model. These adjustments include acres removed from the available timber base for the Monument Rock, North Fork John Day, and Eagle Cap Wilderness additions. (Hells Canyon Wilderness additions were already accounted for in the 1979 inventory.) Unsuited lands and the area of land occupied by existing roads were removed from the inventory. Indian Creek Research Natural Area and Starkey Experimental Forest were removed as not available for scheduled timber harvest. These acreage adjustments reduced the 1979 inventory acre base from approximately 1.2 million acres to 1.06 million acres. Table L-2 displays these adjustments by model component and their effect on the cubic and board measures of standing inventory volume.

Table L-1
VOLUME RECONCILIATION BETWEEN 1968 AND 1979 WALLOWA-WHITMAN TIMBER INVENTORIES

Step	1968 Volume/Acre Expanded by 1979 Inventory Acres	1968 Volume by Plot Expansion 1/
1. 1968 Volume (5"-4" top) Cubic =	2,944 MMCF	2,900 MMCF
2. Gross to net Defect Adjustment from 1968 to 1984 procedure = -12%	-353 MMCF	-348 MMCF
3. Mortality from 1968 to 1979 = 24.5*11 Yrs	-270 MMCF	-270 MMCF
4. Growth from 1968 to 1979 = 41.4*11 Yrs	+455 MMCF	+455 MMCF
5. Harvest 2/ from 1968 to 1979 =	-503 MMCF	-503 MMCF
6. 1968 Volume Adjusted for Change in Defect Calculations, Mortality, Harvest and Growth =	2,273 MMCF	2,234 MMCF
7. 1979 Inventory Volume =	2,278 MMCF	2,278 MMCF
8. Unaccounted Difference Between 1968 and 1979 Timber Inventories =	5 MMCF	44 MMCF
9. Percent Unaccounted Difference	0.2%	1.9%

1/ Plot expansion volume adjusted by removal of plots falling within Eagle Cap Wilderness additions of 1972 (19 plots), Lower Minam Wilderness Study Area (5 plots), and Starkey Experimental Forest (7 plots).
2/ Estimate of cubic volume harvest from "Reconciliation of Forest Inventories" January, 1983. John L. Teply, Timber Management, Regional Office (on file at Supervisor's Office in Baker).

Care must be taken when comparing the 1979 inventory volumes reported here with those reported in the 1979 inventory statistics package. The cubic volume summarized here is based on 5 inch-dbh to 4-inch top for lodgepole pine and a 9-inch dbh to 6-inch top for other species. Summary volumes in the statistics package are either entirely 5-4 inch or 9-6 inch utilization standards.

Both the 1968 and 1979 inventories included standing volume which was under contract at the time the inventories were taken. Adjustment in acreage was necessary prior to FORPLAN modeling to reflect the volume which was under contract in 1979 and the additional volume placed under contract between 1979 and 1984. This volume placed under contract represented timber stands

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unavailable for harvest until the understory or regenerated stands have reached culmination of mean annual increment. Acres were updated using the TRI data base and Timber "Cut and Sold" records current to 1984. Table L-3 presents a summary of the acres as carried into FORPLAN. These acres include adjustments for volume under contract but also reflect collapsing of detail necessary to achieve a reasonable model size.

Since the FORPLAN inventory volumes include available forest land in Idaho, these acres are subtracted to provide acres comparable to the 1979 timber inventory. When the "OREGON 1979 FORPLAN INVENTORY" acres of Table L-3 are expanded against the volume per acre inventoried in 1979, the resulting 7,897 MMBF may be compared with the 9,064 MMBF of the adjusted 1979 timber inventory in Table L-2. The difference, 1167 MMBF, represents volume placed under contract between 1979 and 1984. Table L-4 shows volume under contract in 1979, and the volume sold in 1980, 1981, 1982, 1983 and 1984. These volumes total 1,277 million board feet. Thus the FORPLAN inventory volumes account for 91 percent of the volume placed under contract between 1979 and 1984. The FORPLAN inventory volume therefore appears to fairly reflect the standing inventory volume available on the Wallowa-Whitman National Forest.

FORPLAN is also updated for growth on existing trees to the mid-point of the first decade of the planning horizon. When the FORPLAN inventory acres are expanded against empirical yield tables which include growth to 1991 as a starting point, a net FORPLAN inventory volume of 9,430 million board feet or 1,840 million cubic feet is the result. Comparison of this 1,840 million cubic feet with the "OREGON 1979 FORPLAN INVENTORY" of 1,536 million cubic feet shows a difference of 304 million cubic feet. This growth averages over 12 years to 28.9 cubic feet per acre per year on stands stocked with merchantable trees.

All comparisons above were made against the unconstrained maximum timber benchmark (Region 6 Benchmark 1). Thus further reductions in acres and volume available for harvest occurred in developing alternatives. These included minimum management requirements for wildlife, Hells Canyon NRA Comprehensive Management Plan, and lands on which it is not economical to manage timber, given the objectives of the alternative. Apparent opportunity costs associated with these various constraints are discussed in Appendix B.

Comparison of FORPLAN Outputs with the Draft 1979 Timber Management Plan

The 1979 Draft Timber Management Plan was never published because of the pending Forest Plan. It suggested a programmable harvest level of 231.58 million board feet. Three corrections need to be made to this figure in order to make it comparable with current data:

1) The Draft Timber Management Plan added 57.7 million board feet of lodgepole pine to the programmable harvest volume of pine and associated species to provide for accelerated harvest of lodgepole pine. This represented a departure from nondeclining evenflow.

Table L-2
1979 INVENTORY ADJUSTMENTS
(Oregon Only)

	Vol/Acre 1/		1979 Inventory			Acre Adjustments							Adjusted Inventory		
Model Component	CF	BF	M ACRES	MMCF	MMBF	MNMT	NFJD	ECADD	UNSUITED	STARKEY	INDCR	ROADS	M ACRES	MMCF	MMBF
CD REGEN (0101)	1864	10629	92.71	172.82	985.44	-.32	-.06	-.23	-12.09	-.78	-.01	-.78	78.44	146.22	833.76
CW REGEN (0102)	2371	13328	403.73	957.23	5380.86	-1.62	-6.80	-8.17	-20.30	-6.51	-.07	-3.14	357.13	846.76	4759.83
LP REGEN (0103)	1788	5030	95.45	170.66	480.10	-.38	-3.29	-1.56	-3.04	-.54	-.67	-.89	85.06	152.09	427.87
CD REG 2 (0201)	264	1380	10.53	2.78	14.53	0.00	0.00	-.01	-4.06	0.00	0.00	0.00	6.46	1.70	8.91
CW REG 2 (0202)	85	415	10.64	.90	4.42	-.03	0.00	-.03	-2.85	0.00	0.00	0.00	7.73	.66	3.21
CD CT (0301)	1025	5418	90.25	92.51	488.99	0.00	0.00	-.01	-10.08	-.13	0.00	-.96	79.08	81.05	428.43
CW CT (0302)	1419	7617	145.21	206.05	1106.06	-.52	-.44	-4.32	-5.86	-.39	0.00	-1.14	132.55	188.09	1009.63
CD FO (0401)	1548	8650	11.98	18.54	103.59	0.00	0.00	0.00	-1.24	0.00	0.00	0.00	10.74	16.62	92.87
CW FO (0402)	1698	9148	9.71	16.48	88.79	-.15	0.00	-.25	-.52	-.10	0.00	0.00	8.70	14.76	79.54
LP FO (0403)	778	1350	72.97	56.77	98.51	-1.15	-.64	-3.62	-3.07	-.82	-.10	-.63	62.94	48.97	84.97
CD PT (0501)	0	0	1.97	0.00	0.00	0.00	0.00	0.00	-.48	0.00	0.00	-.22	1.27	0.00	0.00
CW PT (0502)	0	0	4.21	0.00	0.00	-.04	0.00	-.02	-.70	-.26	-.02	-.88	2.29	0.00	0.00
LP PT (0503)	0	0	18.69	0.00	0.00	-.15	0.00	-.25	-.43	0.00	-.01	-.24	17.61	0.00	0.00
CD REF (0601)	0	0	5.39	0.00	0.00	0.00	0.00	0.00	0.00	-.09	0.00	-.16	5.14	0.00	0.00
CW REF (0602)	0	0	11.14	0.00	0.00	-.02	-.01	-.07	0.00	0.00	0.00	-.46	10.58	0.00	0.00
LP REF (0603)	0	0	2.48	0.00	0.00	0.00	0.00	0.00	-.32	0.00	0.00	-.15	2.00	0.00	0.00
CD OR (0701)	879	4843	21.59	18.98	104.57	0.00	0.00	0.00	-1.89	-.28	0.00	-.07	19.35	17.01	93.72
CW OR (0702)	1296	7167	34.05	44.14	244.07	-.57	-.03	-.11	-1.20	-.94	0.00	-.12	31.08	40.27	222.72
CD MT (0801)	1198	6692	48.76	58.41	326.28	0.00	0.00	-.02	-4.35	-.16	0.00	0.00	44.23	52.99	295.98
CW MT (0802)	1543	8212	81.40	125.60	668.43	-.46	-.19	-.71	-3.82	-3.84	0.00	-.69	71.68	110.61	588.68
LP MT (0803)	1250	5059	29.80	37.25	150.76	-.57	-.13	-.75	-1.05	-.81	0.00	0.00	26.48	33.10	133.96
			1202.64	1979.12	10245.41	-5.97	-11.61	-20.13	-77.35	-15.64	-.88	-10.55	1060.51	1750.89	9064.07

1/ Volume per acre from 1979 inventory statistics; 5"-4" for LP, 9"-6" for other species groups.

Table L-3
INVENTORY AS REPRESENTED IN FORPLAN

Model Component	1979 Invent		Total 1979 FORPLAN Invent 1/			Adjust	Oregon 1979 FORPLAN Inventory 2/			OREGON 1991 FORPLAN Inventory 3/			
	CF/AC	BF/AC	M Acres	MMCF	MMBF	ID Mac	M Acres	MMCF	MMBF	MCF/AC	MBF/AC	MMCF	MMBF
CD REGEN (0101)	1864	10629	93.71	174.68	996.09	-3.06	90.65	168.98	963.54	2.16	12.31	195.81	1116.11
CW REGEN (0102)	2371	13328	321.89	763.20	4290.14	-3.17	318.72	755.68	4247.87	2.80	15.74	892.41	5015.35
LP REGEN (0103)	1788	5030	86.30	154.31	434.11	0.00	86.30	154.31	434.11	2.15	6.04	185.55	521.41
CD REG 2 (0201)	264	1380	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CW REG 2 (0202)	85	415	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CD CT (0301)	1025	5418	120.70	123.71	653.93	-1.76	118.93	121.91	644.38	1.27	6.71	151.05	797.52
CW CT (0302)	1419	7617	112.86	160.15	859.68	-1.04	111.82	158.68	851.76	1.75	9.40	195.69	1050.87
CD FO (0401)	1548	8650	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CW FO (0402)	1698	9148	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LP FO (0403)	778	1350	67.17	52.26	90.68	-.82	66.35	51.62	89.58	1.01	1.75	67.02	115.94
CD PT (0501)	0	0	17.99	0.00	0.00	0.00	17.99	0.00	0.00	0.00	0.00	0.00	0.00
CW PT (0502)	0	0	74.37	0.00	0.00	-1.03	73.34	0.00	0.00	0.00	0.00	0.00	0.00
LP PT (0503)	0	0	20.99	0.00	0.00	0.00	20.99	0.00	0.00	0.00	0.00	0.00	0.00
CD REF (0601)	0	0	14.45	0.00	0.00	-.36	14.09	0.00	0.00	0.00	0.00	0.00	0.00
CW REF (0602)	0	0	39.54	0.00	0.00	0.00	39.54	0.00	0.00	0.00	0.00	0.00	0.00
LP REF (0603)	0	0	16.96	0.00	0.00	0.00	16.96	0.00	0.00	0.00	0.00	0.00	0.00
CD OR (0701)	879	4843	6.77	5.95	32.79	0.00	6.77	5.95	32.79	1.05	5.79	7.11	39.17
CW OR (0702)	1296	7167	9.74	12.62	69.81	0.00	9.74	12.62	69.81	1.57	8.68	15.29	84.56
CD MT (0801)	1198	6692	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CW MT (0802)	1543	8212	69.25	106.85	568.65	-.66	68.59	105.83	563.23	1.89	10.05	129.63	689.62
LP MT (0803)	1250	5059	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
			1072.70	1553.74	7995.86	-11.90	1060.79	1535.58	7897.07			1839.55	9430.54

1/ Total FORPLAN inventory acres as reported in the maximize timber benchmark, FORPLAN Run Number 616030, with volumes derived from 1979 inventory.

2/ Oregon portion of FORPLAN inventory acres with volume derived from 1979 inventory.

3/ Oregon portion of FORPLAN inventory acres with volume derived from FORPLAN empirical yield tables.

Table L-6
VOLUME UNDER CONTRACT 1979-1984

Volume Under Contract	1979 =	579.5 MMBF
Volume Sold	1980 =	123.2 MMBF
	1981 =	174.3 MMBF
	1982 =	139.7 MMBF
	1983 =	127.0 MMBF
	1984 =	133.0 MMBF
Total Volume		1,276.7 MMBF

2) The currently mapped acreage of "pine and associated" (equivalent to the current CD and CW working groups) is less than the acreage estimated by plot expansion for the Draft Timber Management Plan. Correcting the acreage results in reduction from 173.9 million board feet of pine and associated timber species to 153.3 million board feet.

3) The conversion ratio from board feet to cubic feet for pine and associated species was estimated at 6.29 to 1 in the 1979 Draft Timber Management Plan, whereas the 1979 inventory shows a conversion ratio of 5.55 to 1 for the equivalent working groups. Reducing the board foot volume of pine and associated timber species to account for this correction in conversion ratios results in a programmable harvest volume of 135.4 million board foot from the pine and associated components. This figure is similar to several of the Forest Plan alternatives developed using the FORPLAN data base.

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